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Johnson, Donald Eldon, M.S.

The University of Arizona, 1991

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DESCRIPTION OF SUBJECTIVE ASSESSMENT OF SLEEP CHARACTERISTICS BY ELDERLY INDIVIDUALS IN A LONG-TERM CARE FACILITY

by

Donald Eldon Johnson

A Thesis Submitted to the Faculty of the

COLLEGE OF NURSING

In Partial Fulfillment of the Requirements
For the Degree of

MASTER OF SCIENCE

In the Graduate College

THE UNIVERSITY OF ARIZONA

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STATEMENT BY AUTHOR

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APPROVAL BY THESIS DIRECTOR

This thesis has been approved on the date show below.

Leanna J. Crosby

7/23/91

Leanna J. Crosby, D.N.Sc., R.N.
Assistant Professor
College of Nursing

Date

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ABSTRACT

The elderly frequently express dissatisfaction with sleep quality and quantity. Disturbed sleep is a common compliant of residents in long-term care facilities.

The purpose of this research was to describe the subjective assessment of sleep characteristics identified by elderly individuals living in a long-term care facility. In addition, the subjects perception of sleep prior to and following admission to the long-term care facility was compared. Information about the environmental factors which may have disrupted sleep was also identified.

Sixteen female and four male subjects participated in this research. Subjects verbally responded to a 39 item questionnaire which was developed specifically for this study. Forty-five percent of the subjects rated their sleep in the nursing home as being worse than when they lived at home. Their bedtime hour moved to an earlier hour and the use of sleeping medication increased when compared to use at home. Physical illness, emotional stress, and changes in the sleep environment disturbed the sleep of the subjects. Although not quantitatively measured, the subjects reported that emotional stress disturbed their sleep more than physical illness or change in sleep environment.

CHAPTER I

INTRODUCTION

Sleep is a physiologic need common to all humans, and the acquisition of uninterrupted "restful" sleep is most desired. However, with an increase in chronologic age, sleep patterns change and as a result, the elderly frequently express dissatisfaction with sleep quality and quantity (Dement, Miles, & Carskadon, 1982). The concerns of the elderly regarding their sleep include, not sleeping soundly, sleeping too little or too much, and frequent awakenings during the night (Hilton, 1976; Webb, 1982a; Webb, 1982b; Hayter, 1983; Reynolds, Kupfer, Taska, Hoch, Sewitch & Spiker, 1985; Poelstra, 1984, and Hilton, 1985).

An early study of sleep among the elderly was reported by Laird (1931). The investigator surveyed 509 men between the ages of 25 and 85. The survey findings indicated "that as age increased there was an increase in sleep latency and an increase in awake time after sleep onset" (Miles & Dement, 1980, p. 121). Recent electrophysiologic studies, have verified the survey findings (Miles & Dement, 1980; Spiegel, 1981; Dement, Miles and Carskadon, 1982).

Although disturbed sleep is a common compliant in skilled nursing facilities, few studies have been designed to evaluate the sleep of institutionalized elderly persons, (Ancoli-Israel, Parker, Sinaee, Fell, & Kripke, 1989). Clapin-French (1986) interviewed 102 elderly persons (mean age 76.9) in three long-term skilled care facilities to determine their sleep patterns. The authors found that following admission to the facility, subjects reported that their sleep was twice as disturbed as they experienced at home. To compensate for disturbed sleep, subjects adopted the practice of routine daytime naps. The investigator also documented environmental and physiological factors which had a significant relationship to frequent nocturnal awakenings. These factors included the need to urinate and the proximity of other people in their sleep environment who disturbed their sleep.

Ancoli-Israel, Parker, Sinaee, Fell, Kripke, (1989) recorded the electroencephalographic (EEG) sleep patterns of 200 subjects in a skilled care institution. The investigator documented extended times in bed (17.5 hours, SD = 3.6) yet only 8 hours of that time was spent sleeping. Furthermore, the subjects sleep was very fragmented due to respiratory disturbances, myoclonic leg motion, nursing care routines and other patients talking, crying or verbalizing loudly.

In general, studies have indicated that the elderly perceive that their sleep is inadequate. Objectives data have quantified sleep disturbances. Few studies have reported the institutionalized elderly subjects subjective assessment of sleep characteristics based on their perception of how environmental, physiological or psychological factors effected their sleep. This is especially important if factors amenable to nursing intervention are to be identified. Furthermore, there is a paucity of data relative to how sleep changes once the elderly person becomes a resident in a long-term care facility.

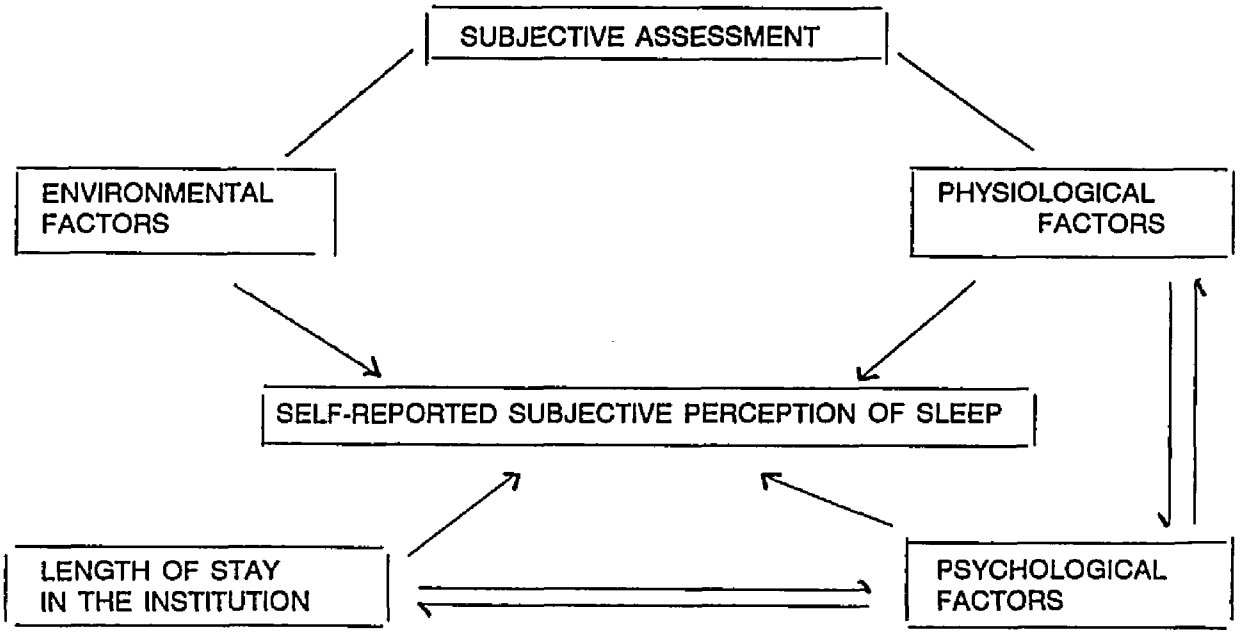
Purpose of Research

The purpose of this research was to describe the subjective assessment of sleep characteristics identified by elderly individuals living in a long-term care facility. In addition, the subjects perception of sleep prior to and following admission to the long-term care facility was compared. Information about the environmental factors which may have disrupted sleep was also identified.

Conceptual Framework

The section outlines the concepts and relationships among concepts central to this research.

SLEEP PATTERNS OF ELDERLY INDIVIDUALS
IN A LONG-TERM CARE FACILITY



The model identifies factors which according to the literature influence sleep patterns of elderly individuals in a long-term care facility. These include environmental factors, physiological factors, psychological factors and length of stay in the institution. The scope of this study is limited to the subjective assessment of sleep and environmental factors as identified by the study subjects.

Subjective Assessment of Sleep

The subjective assessment of sleep is the individual self-report of sleep as measured through the use of a questionnaire. The subjective assessment will pertain to the individuals satisfaction with their sleep. Factors such as sleep latency, increased awake time after sleep onset, and reduced "soundness" of sleep may effect an individuals satisfaction with their sleep.

Day or evening naps, which may be utilized by the individual to supplement nocturnal sleep loss, may be an indicator of the quality of sleep during the night.

Environmental factors

Environment can be considered anything related to the immediate world in which one lives. The actual physical surroundings, both inside and outside the building are the most obvious components of the environment.

The sleep environment can positively or negatively affect the quality of sleep. Little objective data exist regarding the effects of the environment on the sleep of the elderly. Institutationalization in a long-term care facility may impose major environmental changes that disrupt established patterns and routines (Pacini & Fitzpatrick, 1982).

Physiological factors

Many physiological factors may adversely affect the sleep of the elderly (Reynolds, Kupfer, & Sewitch, 1984). Numerous disease processes such as arthritis, angina pectoris, chronic obstructive pulmonary disease, congestive heart failure, diabetes mellitus, peptic ulcer disease, and alcoholism, may cause additional sleep disturbances (Miles & Dement, 1980; Lerner, 1982).

Psychological factors

"Old age is a time of losses: job, physical capabilities, significant others, and material belongings" (Hoch, & Reynolds, 1986, p. 25.). These losses create emotional stress which may lead to depression and anxiety (Colling, 1983). Institutionalization in a long-term care facility along with changes in the sleep environment, unusual routines, noise, and lack of privacy may likely exacerbate emotional stress of the elderly (Ross, Hare, & McPherson, 1986). Stress disturbances are frequently displayed through insomnia and multiple awakenings (Karacan, & Williams, 1983).

Length of stay in the institution

The effect of length of stay on the sleep patterns of elderly person in long-term care facilities has not been conclusively established. Although it is possible, over time, to become habituated to noise (Johnson, Townsend, & Wilson, 1975), it is unclear whether sleep improves, worsens, or undergoes changes in relation to the length of stay in the institution.

Problem Statement

Sleep of non-institutionalized elderly has been documented as being fragmented (Dement, Miles & Carskadon, 1982; Herbert, 1978). It is believed that the sleep of elderly in a long-term care facility would be even more fragmented than that of non-institutationalized peers due to environmental factors, as well as, physical and psychological factors. In an effort to understand the sleep of the elderly in a long-term care facility, it was necessary to obtain information about the subjective characteristics of sleep among the elderly residents of a long-term care facility, as well as, document those specific environmental factors that led to fragmented sleep.

Research Questions

The following research questions were used to guide this research:

1. What is the subjective assessment of sleep of the elderly in a long-term care facility?
2. How do the sleep characteristics differ when compared to sleep characteristics prior to admission to the long-term care facility?
3. What are the environmental factors which affect sleep in a long-term care facility?

Significance to Nursing

Sleep is a basic physiologic need. Sleep can be a restorative process, but it can be negatively influenced by a number of factors. A paucity of data exist which describe the subjective assessment of sleep of the elderly. Furthermore, little objective data is available

concerning the effects of the environment in a long-term care facility on the sleep of the residents.

It is increasingly important, with the growing numbers of elderly in long-term care facilities, to identify those factors which disrupt sleep. Identification of such factors will enable the development of interventions designed to improve the sleep of the elderly.

CHAPTER 2

LITERATURE REVIEW

This chapter contains a review of the literature relative to electroencephalographic (EEG) patterns in wakefulness and in sleep, theories of sleep, sleep deprivation, sleep of the elderly, and sleep within long-term care facilities.

Electroencephalographic Patterns In Wakefulness And Sleep

Sleep occupies approximately one-third of a person's life. The function of sleep, the mechanisms of sleep regulation, the physiology of sleep, and the role of sleep in human mental and physical health has been questioned since antiquity. For many years scientists believed that the brain lapsed from wakefulness to sleep because of a lack of sensory stimulation. The sleep period was thought to be a uniform state and descriptions of sleep were based on observations of single individual variables, for example, the position of the eye at one point in time during the night (Dement & Mitler, 1974). The development of electroencephalography (EEG) in the late 19th century enabled investigators to record the small-amplitude electrical activity of the brain without disturbing the sleeping subject. In 1875, using elementary amplifiers, Caton recorded spontaneous electrical activity from the brain of cats, monkeys and rats. He discovered minute oscillating currents between two points on the surface of the brain, or between the skull and the surface of the brain. In 1925, Hans Berger, Professor of Neurology and Psychiatry in central Germany, recorded electrical brain waves from wires attached to the scalp of his young son. He noted that the EEG activity varied consistently as a person's state of vigilance changed from wakefulness to sleep and then again the wakefulness (Dement & Mitler, 1974; Morgan, 1987). Berger reported that the EEG activity was low amplitude when the subjects were awake and actively thinking, and high amplitude when the subjects were asleep. These data were not well accepted until 1937 when Loomis, Harvey, and Hobart reported all-night EEG studies which demonstrated that "sleep consisted of alternating stages which could be differentiated by their EEG patterns, and that these stages

appeared spontaneously under the direction of some central nervous system regulatory mechanism" (Baker, 1985, p. 1124). These EEG patterns varied dramatically throughout the sleep-wake cycle depending upon the time of night and time since the onset of sleep (Dement & Mitler, 1974; Baker, 1985). It was also observed that as the EEG waveform frequency slowed and the amplitude increased, the level of arousal decreased. This led to the assumption that sleep consisted of different levels or depths. The level of cortical activation was assumed to be dependent upon "the amount of activity in a hypothetical ascending extralemniscal system in the brain stem" (Dement & Mitler, 1974, p. 273). This system was called the reticular activating system, and it was believed, by the early researchers, that the continuum of sleep and arousal was controlled by this mechanism (Baker, 1985). Further development of the EEG recording instrument by Nathaniel Kleitman, allowed documentation of a course of events consisting of cyclic alterations in the depth of sleep throughout the sleep period. Specific patterns of frequency, amplitude and wave forms allowed for identification of the sleep stages. The identification of rapid eye movement (REM) sleep and its association with dreaming, by Aserinsky and Kleitman in 1953, added to the descriptions of the various stages of sleep (Baker, 1985).

The discovery in 1958 by Dement that REM sleep also occurred in cats, renewed interest in the search to discover the purpose of REM sleep. Two researchers, Jouvet and Michel (cited in Dement & Mitler, 1974), observed that electromyographic (EMG) activity was quite active during non-REM sleep periods, but during REM sleep periods, the EMG activity was totally suppressed. This finding was totally different than all previous assumptions about sleep and led to the first assumptions that sleep was not a unitary state (Dement & Mitler, 1974). Jouvet and Michel suggested that "this motor inhibition was an active process regulated by the central nervous system" (Baker, 1985, p. 1124). Further research identified the same muscle atonia in humans, as well as specific EEG features of spontaneous electrical activity of the brain during REM sleep. At this time it became clear to sleep researchers that "some very unique

phenomena were part of the spontaneous electrical activity of the brain during REM sleep" (Dement & Mitler, 1974, p. 277). It became evident that sleep consisted of two processes, and that REM sleep originated from the brain stem. Closer scrutiny of the physiologic variables lead to the proposal that REM sleep was one type of sleep and the other stages were another type of sleep, called non-rapid eye movement sleep (NREM). The focus of research became one of discovering what mechanism ordered the two states, REM and NREM. Jouvet proposed that a serotonergic neurotransmitter initiated NREM sleep, and that a catecholaminergic neurotransmitter was involved with REM sleep (Baker, 1985; Dement & Mitler, 1974).

Early sleep research which used EEG and sleep stage changes, lacked reliability regarding the classification of sleep stages. However in 1968, a committee under the direction of Allan Rechtschaffen and Anthony Kales developed precise definitions of sleep stages enabling uniform classification of sleep stages (Rechtschaffen, & Kales, 1968). The classification is based on cycles per second (CPS) and voltage designated as microvolts (MV). The essential electrographic parameters used for the determination of sleep stages are the electroencephalogram (EEG), electro-oculogram (EOG), and electromyogram (EMG).

It is now known that wakefulness, non-rapid eye movement (NREM) sleep, and rapid eye movement (REM) sleep are different states of consciousness, and that during sleep individuals alternate between REM and NREM sleep (Baker, 1985). Each state of consciousness has identifying waveform characteristics.

Wakefulness if characterized by spontaneous, low-voltage, mixed frequency activity. The EEG pattern is desynchronized, and the level of muscle activity is high. An individual is alert and responds appropriately to internal and external stimuli (Rechtschaffen, A. & Kales, A., 1968).

NREM sleep is subdivided into four stages numbered 1 through 4. EEG activity relative to sleep stage demonstrates progressively slower cycles per second (CPS) as the person goes from stage 1 to stage 4. However, the height of the waveform (voltage) becomes greater through stage 1 to stage 4. Thus time (CPS) and voltage are inversely related.

Stage 1 sleep is a transitional stage between waking and sleep. EEG activity is of low-voltage, mixed-frequency with a prominence of activity in the 2-7 CPS range. As sleep progresses, slower frequencies begin to appear as well as high-amplitude vertex sharp waves may appear. EMG activity is usually higher than in other sleep stages. EOG leads often show disconjugate slow rolling eye movements. Stage 1 makes up only five to ten percent of total sleep time.

Stage 2 sleep is recognized by the presence of sleep spindles (16 to 18 CPS) and K-complexes. Stage 2 sleep usually constitutes forty-five to fifty-five percent of total sleep time in adults (Baker, 1985).

Stage 3 sleep is recognized on the EEG by high-voltage, slow wave activity in twenty to fifty percent of a one minute sleep epoch. EMB activity is usually low, and eye movements are absent.

Stage 4 sleep is identified by the presence of high-voltage, slow waves in more than fifty percent of a one minute epoch. Stages 3 and 4 sleep are often combined, since they differ only in the proportion of slow waves in the EEG, and are collectively called slow-wave sleep (SWS) (Rechtschaffen, A. & Kales, A., 1968). During the early part of the night, stage 3 sleep usually appears as a transition stage between stages 2 and 4. Stages 3 and 4 sleep constitute about ten to twenty percent of total sleep time (Baker, 1985). During NREM sleep, muscle tone and activity are decreased, oxygen consumption in the muscles is decreased, body temperature decreases, blood pressure is at its lowest, and both cardiac output and heart rate decrease. Regional cerebral blood flow decreases, and growth hormone is at its highest levels during stage 3 and stage 4 (Baker, 1985).

Rapid eye movement sleep (REM) is characterized by rapid eye movement and low voltage, asynchronous, fast cortical activity which resembles the EEG pattern of stage 1 sleep (Rechtschaffen, A. & Kales, A., 1968). During REM sleep there is a high degree of autonomic variability, the heart and respiratory rate increases and decreases, and the blood pressure may

be elevated. Cerebral blood flow is greatest during this stage than during NREM sleep stages (Baker, 1985). The first REM sleep period occurs about ninety minutes after sleep onset. REM periods tend to become longer as the night progresses. REM sleep is a paradox of the presence of fast cortical EEG activity similar to the awake state, yet with diminished muscle tone, a sign of deep sleep. REM sleep is also a time of profound motor paralysis, in which deep tendon reflexes cannot be elicited (Dement, & Mitler, 1974). Dreaming probably occurs throughout each REM sleep episode. Metabolic changes which occur during REM sleep include increased brain temperature and increased brain oxygen consumption. Thermoregulatory mechanisms such as sweating, shivering, thermal vasodilation or vasoconstriction, and thermal, tachypnea are relatively inactive or absent in REM sleep (Baker, 1985). "Protein synthesis is believed to occur during REM sleep. Since memory is thought to involve the deposition of proteins within nerve cells, speculation is that REM sleep is linked with memory storage, memory consolidation, and learning" (Chuman, 1983, p. 178).

The sleep period consists of a cyclic alternation between NREM and REM sleep stages throughout the night. This cycle varies between 70 and 120 minutes in duration. The mean duration of the sleep cycle and the sleep-stage content of each cycle changes during the course of a night's sleep. The slow-wave NREM sleep stages tend to predominate in the first one-third of the night, while REM sleep and stage 2 NREM predominate in the last third of the night. Body movements and brief awakenings may occur throughout the night.

Theories of Sleep

The past thirty years of sleep research has provided a significant amount of information about electrophysiologic sleep stages, sleep cycles, and effects of sleep deprivation, yet the function of sleep has eluded researchers. Several theories have been proposed relating to the function of sleep (Baker, 1985).

The restorative theory, "holds that sleep is a period of recovery of restoration of physiological, neurological and psychological states" (Webb, 1979, p. 20). During NREM sleep,

growth hormone is secreted from the anterior pituitary in an episodic manner which enhances amino acid transport into cells, and promotes protein synthesis (Chuman 1983). This leads to speculation that SWS enhances tissue restoration. The experimental support for this position of physical recovery relates to the fact that with prolonged wakefulness and exercise the amount of SWS increases (Webb, 1979). Bio-chemical support comes from evidence of increased rates of mitosis and protein synthesis with rest and sleep (Webb, 1979). "Certainly the fact that we go to sleep tired and wake rested and recovered lends strong support to this theory" (Webb, 1979, p. 21).

The protective theory "asserts that the function of sleep is to protect the organism from excessive wear and tear" (Webb, 1979, p. 22). Webb (1979), quoted from Claparede, a French researcher who in 1905 stated that "we do not sleep because we are exhausted, but to avoid becoming exhausted" (p. 22). Pavlov in his animal conditioning research in 1927, supported the protective theory in response to the observation of the continuous elicitation of sleep during his experiments. His evidence is based on the belief that a state of wide spread inhibition (sleep as we know it) was the result of "exhaustion which fulfills the role of a protector of cortical elements, preventing any excessive fatigue or dangerous functional destruction" (Webb, 1979, p. 22). Basically, Pavlov believed that the brain "tuned down" during sleep (Long, 1987). Research by Moruzzi (1966) countered these findings by the analyses of the neurophysiology of sleep. This analysis documented that "the neurons of the motor and visual cortices never rest" (Webb, 1979, p. 22). Moruzzi did state that it would be "impossible to deny that some neurons of the ascending reticular system share the same properties of the interneurons of the cerebrum with regard to the need for prolonged periods of rest" (Webb, 1979, p. 23), thereby, supporting the theory that sleep is a protective state.

Sleep as a conservation state comes from an evolutionary point of view. This position maintains that because mammals have a high activity level and the ability to maintain a constant body temperature, sleep evolved to periodically force a period of dormancy in which energy is

conserved to partially offset the increased energy demands of maintaining homeostasis during wakefulness (Webb, 1979; Long, 1987).

The instinctive theory regarding the function of sleep maintains that sleep is a behavior which is elicited in the presence of particular cues (Webb, 1979). Moruzzi postulated that "protective restorative homeostasis is maintained by functionally integrated patterns of instinctive behavior" (Webb, 1979, p. 24). "Because sleep is under neural control, equal with behavior such as feeding and mating, which are organized at the brain stem level, sleep is an instinctive behavior" (Webb, 1979, p. 24).

These theories provide insight yet conflicting ideas concerning the meaning of sleep. This has resulted in an entanglement of presumptions about the purpose of sleep. Generally sleep is considered to be a restorative process. "It represents a reactionary defense of the body against fatigue, and provides a time when the body compensates for an energy deficit acquired during its daily function" (Snyder-Halpern & Verran, 1987, p. 155). Baker (1985) stated that "the most defensible statement about sleep function, although perhaps unsatisfying, is that sleep prevents the symptoms of sleep deprivation, and decreases the tendency for sleep to occur when it is not wanted" (p. 1137).

Sleep Deprivation

With the acceptance that sleep consisted of two independent states, the question of the function of these two states became the focus of research. It has always been questioned whether it is the actual fact of being asleep that makes the difference in the way one feels in the morning, or if it is being in bed, being in the dark, or simply the rest (Dement, 1976). In attempting to answer these questions, researchers began to selectively deprive subjects of specific sleep stages. These deprivation studies were done by waking the subject when the specific sleep stage appeared as demonstrated by the EEG. Kleitman, in his early deprivation research (1922), planned a study in which subjects maintained a regular routine of living, except sleep, to evaluate whether sleep deprivation adversely affected their ability to "live a normal life".

Subjects would go about their daily activities and at night would retire to bed, but stayed awake. During the first night, staying awake was fairly easy to accomplish, but became impossible during the second night. In order for the subjects to stay awake they had to engage in some physical activity. During the second daytime, it became progressively more difficult to accomplish tasks of any duration, i.e. taking ones pulse for one minute. If the subject sat down, i.e. to attend a class lecture, it became impossible for the subject to avoid falling asleep. Kleitman reported that even a severely sleep-deprived individual could perform almost any task with success, if such task was of short duration, but that during sustained repetitive tasks, the subjects could not perform well (Dement, 1976). In 1959, Fisher & Dement conducted experiments which selectively deprived subjects to REM sleep. Two subjects were awakened whenever the beginning of a REM period appeared on the EEG. They discovered that the more they attempted to prevent REM sleep, the more it occurred and with less latency. They also discovered that during the recovery nights, after REM deprivation, the duration of the REM periods increased. This increase in REM sleep became known as "REM rebound" (Dement, 1976). Additional experiments confirmed this occurrence and "seemed to suggest a specific need for REM sleep" (Dement, 1976, p. 91). Early studies of total sleep deprivation and REM sleep deprivation suggested that sleep loss could result in serious psychological problems. Behavior that was observed after one or two nights without sleep or from several successive nights of little or inefficient sleep, included irritability, fatigue, confusion, and an inability to concentrate (Dement, 1976; Chuman, 1983; Baker, 1985; Brewer, 1985; Downey & Bonnet, 1987). Recent studies have confirmed that these symptoms do occur after sleep loss, but not the serious permanent psychological problems once thought to occur (Dement, 1976; Baker, 1985).

Carskadon & Dement (1979) assessed performance, mood, and sleep tendency in two women and four men, ages 18-21 years, following two nights of sleep loss. In this study, performance was measured utilizing the Wilkinson Addition Test and the Serial Alternation Task.

A mood scale, adapted from Lubin, was also utilized to subjectively evaluate mood changes during the experiment. Sleep tendency was assessed utilizing the Stanford Sleepiness Scale, as well as objectively measuring sleep latency. This study demonstrated a significant reduction of performance during the sleep deprivation times, and also demonstrated that the mood of the subjects was less positive than at baseline. A significant finding was the performance and mood showed almost complete recovery after only one night of recovery sleep.

Bonnet (1985) evaluated the effects of partial sleep deprivation on sleep, performance and mood. The subjects included eleven individuals, ages 18-32 years. The study was conducted over five nights, which included one baseline, two nights of periodic disruption, and two recovery nights. Disruption consisted of an audiometer tone which was presented after one minute of EEG defined sleep. The sleep disruptions resulted in fragmented sleep with only small amounts of SWS and REM sleep. Because the disruptions reduced total sleep time by approximately one hour, the subjects were allowed to sleep an additional 30 minutes in an attempt to equalize the actual sleep time prior to the disruption nights. After the arousal from sleep, and acknowledging wakefulness to the researcher, the subjects were allowed to return to sleep, only to be awakened again according to protocol. The subjects reported a significant amount of daytime sleepiness, and diminished performance as measured by the Wilkinson Addition Test and Digit Symbol Substitution. These processes were reduced even more when similar subjects had total sleep loss for one night. Bonnet concluded that the "fragmentation itself may somehow interfere with the sleep restorative process" (p. 18).

Additional support for the loss of performance and adverse change in mood comes from a study done by Carskadon & Dement (1985) who evaluated the sleep patterns during two nights after a 38 hour sleep loss period. Also evaluated, during the sleep loss time was performance, utilizing a modified Wilkinson Auditory Vigilance Task, sleepiness, assessed by Stanford Sleepiness Scale, and sleep latency, utilizing the Multiple Sleep Latency Test. Two groups of five subjects, eight women and two men, ages 61-77 years, were assessed before,

during, and after 38 hours of sleep loss. During the sleep loss period, performance showed a significant impairment associated with an increased tendency to fall asleep. No subject complained of any physical or psychological difficulties during the sleep loss period. After only one night of recovery sleep, performance, mood and sleep latency returned to baseline levels with no further deficit noted.

In summary, researchers have documented that sleep loss in humans results in a decrease in vigor, an increase in fatigue, and an increase in mood disturbance. With a sleep recovery period, these changes diminish and shortly disappear.

Normal Age Related Changes in Sleep Patterns

Sleep gradually changes in quality and quantity throughout the life span (Webb & Swineburn, 1971; Dement, Miles, & Carskadon, 1980; Miles & Dement, 1980; Webb 1982a; 1982b; Karacan & Williams 1983; Carskadon & Dement, 1985). An early study by Kahn & Fisher (1969) evaluated 16 male volunteers, ages 71 to 95 years, for four to six nights in the sleep laboratory. They documented a positive correlation between age and the number of awakenings, and a negative correlation between age and percentage of time asleep. Kahn, Fisher, & Lieberman (1970) then studied 10 females, ages 66 to 87 years, for four to five nights in the sleep laboratory. The investigators reported data similar to that of the previous study, in that age correlated positively with the number of awakenings and negatively with the percentage of time asleep. Subsequent studies as summarized by Miles and Dement (1980) indicated that "complaints of nonspecific sleep disturbance, awakenings during the night, and the use of sedative-hypnotic medications all increase with age" (p. 1210) Bliss, Feinberg, Gaillard, Kupfer, & Webb (1983), conducted all night EEG sleep studies on 70 male and 46 females. Subjects were divided into four ten year age groups, ranging from 20-30, 31-40, 41-50 and 51-60 years. The findings demonstrated that the total minutes of stage 1 sleep increased as age increased while the amount of stage 4 sleep was dramatically decreased with each ten year increase in the age groups, and the amount of REM sleep increased in a linear

fashion, as age increased. Overall, the sleep of the elderly can be characterized as non-efficient, that is, the elderly spend more time in bed yet spend less of that time sleeping (Carskadon, Brown, & Dement, 1982; Carskadon, & Dement, 1985). However, they may achieve an equal amount of sleep, as a young person, by napping during the day (Johns, 1971). The elderly also take longer to fall asleep, and spend more time awake after sleep onset (Karacan, & Williams, 1983).

Webb (1987) evaluated the sleep of 29, 60 to 70 year old males and twenty-five, 60 to 70 year old females, for four successive years through the use of sleep diaries, post-sleep inventories of sleep quality, objective sleep recordings, and mental status, mood and personality measures. This longitudinal collection of data revealed that "16% estimated their sleep latencies to be longer than 30 minutes, twenty-one percent were awake for more than 30 minutes after sleep onset, and eight percent had both long latencies and high awake times. Thus, nearly one-half of a group, 60% of whom were 50 to 60 years old and 40% who were 60 to 70 years old, showed evidence of disturbed sleep" (Webb, 1987, p. 9).

Confirming the complex determinants of elderly sleep disturbances has remained unanswered. Suggested causes include emotional stress, physical illness, effects of medications, and circadian asychrony (Colling, 1983).

Aging is associated with various losses; employment, physical capabilities, significant others, and material belongings (Hoch, & Reynolds, 1986). Such losses may precipitate anxiety or depression, which may impact on sleep leading to frequent awakenings during the sleep period. Anxiety is often triggered by an emotional conflict such as a change in environment, fear of living alone, noise, and the imposition of having to live in a nursing home (Billard, & Besset, 1987). The elderly may take refuge in bed to escape from dealing with psychophysiologic problems. This avoidance method may result in a vicious cycle becoming established of the effort to sleep and the sleeping place becoming associated with frustration

and awakenings. This then may make sleeping and the sleeping place a stressful event, thereby perpetuating sleep loss (Karacan, & Williams, 1983; Reynolds, Kupfer, & Sewitch, 1984).

Sleep disturbances are often associated with medical disorders, including any condition in which pain and physical discomfort are symptoms (Kales, A. & Kales, J., 1974). The US Department of Health, Education, and Welfare, in 1981, estimated that two-thirds of those over age 65 have one chronic disease, and approximately one-half have multiple chronic diseases, implying that a significant number of the elderly have sleep disturbing medical problems. Coronary artery disease frequently occurs among the elderly. The sudden changes of vasoconstriction at the onset of REM sleep, along with tachycardia followed by a rebound bradycardia may cause an angina episode which awakens an individual (Colling, 1983). The incidence of ulcer disease increases after the age of 60 (Karacan, & Williams, 1983). Ulcer patients may secrete three to twenty times more gastric acid, at night, than do normal subjects, with peak times corresponding to REM sleep periods (Kales, A. & Kales, J., 1974; Colling, 1983). Epigastric pain that causes awakening is also a frequent complaint of patients with duodenal ulcers. Clearly pain and discomfort are associated with sleep disturbances.

Recent research has revealed a relationship between sleep disturbances and respiratory disturbances (Carskadon & Dement, 1981). Research by Orr (1980). Phillipson (1978), and Sullivan (1980) presented "convincing evidence that respiratory regulation proceeds differently during sleep as opposed to wakefulness. This difference makes it possible to account for the co-existence, in sleep disorders, of normal breathing during wakefulness and pathological breathing during sleep" (Dement, et al., 1985, p. 700). Webb (1974) measured the oxygen consumption in 20 healthy volunteers, ages 19 to 63 years, and reported that nine of the eleven subjects who were 45 years old or older had very irregular respiration during sleep (Dement, et al., 1985). Carskadon and Dement (1981) conducted observations of respiration during sleep in 40 elderly subjects (22 women, ages 62 to 74 years, and 18 men, ages 63 to 86 years), who were healthy and did not complain of sleep difficulties. The researchers found that 15 of the

40 (37.5%) subjects experienced five or more apneic pauses, (cessation of airflow for 10 seconds or longer) or hyponea, (50% reduction of airflow amplitude for 10 seconds or longer) per hour of sleep. These respiratory disturbances were terminated by an arousal from sleep, which prompted the conclusion "that more than one-third of the elderly subjects experienced five or more interruptions of their sleep per hour" (Dement, et al., 1985, p. 701). Ancoli-Israel, Kripke, Mason, & Kaplan (1985), randomly selected 145 healthy individuals, 65 years of age and older, and reported that one-third had in excess of 30 apneic episodes per night, resulting in oxygen saturation levels that may not be adequate for oxygenation of cells. Dement, Miles, & Carskadon (1982) quoted a case study by Mendelson related to four patients with a diagnosis of sleep apnea who demonstrated an alarming increase in the duration of sleep apnea episodes after administration of 30 mg. of flurazepam. The number of apnea episodes did not increase, but the duration increased from one to three minutes, with one apnea episode lasting five minutes, which was terminated by the investigator waking the subject. Orr (1980) studied the effects of injecting water into the trachea of dogs during sleep, and reported that the protective cough mechanism was "not elicited unless first preceded by arousal from sleep, and that these reflex mechanisms have been shown to be significantly depressed during REM sleep" (p. 143). Therefore, the awakenings from sleep are important in terminating episodes of upper airway obstruction and preventing the occurrence of clinically significant arterial denaturation (Orr, 1980). Despite the fact that awakenings occur, the frequency and duration of these awakenings are detrimental to achieving a "good nights sleep". The usual response to complaints of disturbed sleep is to prescribe or administer sleeping medication. The effects of medications can actually be detrimental to achieving good sleep.

Often, the elderly turn to drugs and alcohol to help them sleep, but these may actually cause more disturbed sleep due to the depression of the central nervous system respiratory drive, and secondary complications of medication interactions causing restlessness and sleeplessness (Karacan, & Williams, 1983; Dement, Miles, & Carskadon, 1982). Although a

small amount of alcohol may help the elderly fall asleep, alcohol in larger quantities disturbs sleep by decreasing the ability to maintain sleep during the night and causes early morning awakenings (Karacan, & Williams, 1983; Spiegel, & Azcona, 1985; Muncy, 1986). Consumption of large quantities of alcohol also results in an increase in urine output producing a need to urinate during the night sleep period, thereby further interrupting sleep (Spiegel, & Azcona, 1985).

Sedative-hypnotic medications are drugs that promote drowsiness, and it has been assumed that the ingestion of a sedative-hypnotic drug before bedtime would reduce sleep latency and increase the amount of quality of sleep. It has further been assumed that by improving the nighttime sleep this would improve the daytime alertness and general sense of well being for the elderly. This use of sedative-hypnotics has been utilized with apparent success as a treatment for complaints of poor sleep (Dement, Miles, & Carskadon, 1982). Sedative-hypnotic medications initially reduces wakefulness, shortens sleep latency and reduces nocturnal awakenings (Billiard & Besset, 1987). After a period of about one week of consecutive use, the effectiveness decreases, and with chronic use, these drugs are quite ineffective (Kales & Kales, 1974). Chronic use of sedative-hypnotic drugs result in a marked reduction in REM sleep periods and a marked decrease to a complete absence of stage 3 and 4 sleep periods (Brewer, 1985; Hoch & Reynolds, 1986). Sedative-hypnotic drugs also depresses the central nervous systems respiratory drive causing a lengthening of sleep apnea episodes. This lengthening could be fatal to the elderly individual (Colling, 1983). Another major problem with sedative-hypnotics is that due to changes and or decreases in the absorption, metabolism, and excretion rates of drugs with aging, the effects of these drugs may continue into the daytime, resulting in daytime confusion, sluggishness, and injuries (Lerner, 1982; Dement, Miles, & Carskadon, 1982; Ross, Hare, & McPherson, 1986; Hoch & Reynolds, 1986). As a result of these problems the elderly person is likely to have more trouble falling asleep and staying asleep than before starting the sedative-hypnotic medication. Because the

elderly are also likely to be taking a variety of other drugs for treatment of one or more medical problems, there is also a risk of drug toxicities and undesirable interactions (Colling, 1983; Clapin-French, 1986; Billiard & Besset, 1987).

The effect these medications have which disturb night-time sleep, which in turn influence the occurrence of day-time naps, has led researchers to suspect that the biological rhythms, inherent in the body, may be altered by the hypnotic-sedative medications, causing further sleep disturbances.

Biological rhythms are responsible for many different physiological processes within an organism (Colling, 1983; Johnson, & Hastings, 1986), and the disruption of this internal rhythm has clinical consequences. Disorders of the sleep-wake schedule involved a "misalignment of the circadian periodicity of the physiologic functions with the scheduling of major sleep and awake periods in a twenty-four hour period" (Karacan, & Williams, 1983, p. 147). The sleep-wake pattern serves as the pacemaker for the physiologic variations of temperature, hormone secretion, electrolyte levels, and motor activity (Regestein, 1980). Many elderly individuals lack the motivation or need to maintain a regular schedule of sleeping, eating, and activity, which increases the probability of circadian asynchrony occurring (Clapin-French, 1986). The tendency towards disorders of the circadian rhythms may underlie the lightened sleep of the elderly (Miles, & Dement, 1980; Webb, 1982a). One theory regarding the cause of circadian asynchrony is that of central nervous system deterioration. The decrease in blood flow due to arteriosclerosis and changes in peripheral resistance decreases the perfusion to neurons that affect the neural mechanisms of sleep (Colling, 1983). Another cause of circadian asynchrony may be the decreased sensitivity with hearing and vision loss which decreases or deprives the individual of external time cues of light and dark necessary for the daily resynchronization of the clock (Karacan, & Williams, 1983; Johnson, & Hastings, 1986). The tendency for the elderly to take daytime naps and prolonged time spent in bed not sleeping also affects the circadian rhythms (Colling, 1983; Karacan, & Williams, 1983; Clapin-French, 1986). Because an institution

tends to be noisy, and because the elderly have a heightened responsiveness to external stimuli during sleep, they are awakened more during the night sleep period contributing to circadian asynchrony (Zepelin, McDonald, & Zammit, 1984). The abnormalities of the circadian sleep/wake cycle may be casually related to other disorders which are responsible for the difficulties elderly people have with maintaining effective sleep (Dement, Miles, & Carskadon, 1982; Dement, Richardson, Prinz, Carskadon, Kripke, & Czeisler, 1985).

Sleep Within Long-term Care Facilities

The physical aspects of the sleep environment, such as privacy, presence of a bed partner, and a suitable bed are important concerns for the elderly. The quantity of observations of the elderly in institutional settings have been limited, thereby limiting our understanding of sleep in this environment.

An early study by Webb, & Swinburne (1971) observed 9 males and 10 females whose ages ranged from 66 to 96 years, in a self-care ward. The subjects had no extreme pathology, and required minimal assistance with personal hygiene. Two, 36 hour observation periods, one week apart, were used to observe the life style and sleep activity. Sleep drugs were withdrawn before the study commenced. The observations revealed that the subjects spent almost 50% of their time in bed, although sleep length was 8.1 hours for men and 7.2 hours for women. Their sleep was often interrupted by periods of wakefulness; almost all took one or more daytime naps; and their nap lengths were unrelated to their night sleep, "thus appearing to be neither compensatory or limiting relative to night sleep" (p. 897). Also documented by the researchers was the 38% of the nighttime arousals were attributable to bladder control and physical discomfort. Miles and Dement (1980) in their review of sleep research reported that investigators have found that environmental noise is more disturbing to the sleep of elderly people than to young people. Roth, Kramer, & Trinder (1972) in their sleep laboratory study of how noise disturbs sleep, studied six subjects, two from each age group, 25, 50, and 70 years, and documented that noise had a more pronounced effect of disturbing sleep among

the elderly, and the elderly were much more easily disrupted by noise than a young person. Thus, the elderly person appears to be more susceptible to arousal from sleep by any external stimuli.

The disruption of sleep in a skilled care institution, was also reported by Gress, Bahr, & Hassanein (1981) who observed 11 subjects from 60 to 97 years of age and documented that only one subject was asleep at each hourly visit throughout three nights of observation. Also noted by the observers were sounds that may have been unnoticed during the day (conversation, laughter, careless handling of equipment and supplies) were highly amplified in the relative quietness of the night.

Cohen, et al., (1983) interviewed 148 subjects in a nursing home and documented that 45 percent of the subjects had sleep disturbance complaints. Sleep latency averaged 43.2 minutes and awakenings during the night which significantly disturbed sleep averaged 1.4 times per night.

Clapin-French (1986) studied 102 subjects, 35 male and 67 female, 65 years of age or more (mean age 76.9 years), that resided in three long-term care facilities. At the time of interview, 39 of the subjects had been in the facility less than six months, 36 between six months and two years, and 27 longer than two years. Two questionnaires were used to collect the data through interviews with each subject. The first questionnaire concerned sleep prior to being admitted to the facility, and the second questionnaire concerned the sleep patterns after admission. The author reported that most of the subjects adopted the practice of napping during the day and also reported interrupted sleep twice as frequently after admission to the facility. The preferred bedtime also changed to an earlier hour after admission to the facility. The most frequently occurring events which led to interrupted sleep were needs associated with elimination, as well as the proximity of other people. Records also indicated that 71% of the subjects received sleeping medication on a regular basis, compared to only 25% that admitted that they took sleeping medication prior to admission.

Regestein, & Morris (1987) collected observations done by nurses as well as polygraphic recordings of 16 women in an institutional setting and concluded that there is a wide individual variation in the sleep/wake patterns. Short sleepers averaged 5.0 to 7.2 hours of sleep in 24 hours, and long sleepers who averaged 8.8 to 12.1 hours in 24 hours. Other variations, contrary to expectations, were that some residents who were awake more at night, remained awake more during the day. The presence of daytime napping seemed to increase as total night sleep also increased. This pattern of individual variation in sleep habits has also been referred to by Miles & Dement (1980) in their review of sleep research, and it precludes the ability to make firm generalizations about sleep in the elderly in an institutional setting.

Ancoli-Israel, Parker, Sinaee, Fell, & Kripke (1989) objectively recorded 200 patients in a nursing home, documenting a "remarkable amount of sleep disturbance and related daytime sleepiness" (p. M18). The subjects were recorded for 15.4 hours per night and the researchers documented that the patients averaged 39.5 minutes of sleep per hour. The patients obtained an average of 7 hours and 58 minutes of sleep per 24 hour period, but were in bed for substantially long periods of time (17.5 hours per 24 hours). During the recorded time, the sleep of the subjects was so fragmented that "it was impossible to distinguish when napping ended and a consolidated major sleep period begin" (p. M20). To better understand the full 24 hour sleep/wake cycle, wrist activity recorders were applied to four of the residents. This documented daytime naps averaging 110 minutes long during the late morning and early afternoon. The many awakenings during the night may be related to the fact that nursing home residents tend to be less healthy than independently living peers, nursing care activities, and medication administration which awakens the individual resident as well as neighboring residents. Confused and delirious residents may cry out or yell during the night, further contributing to noise and awakenings.

A related study by Jacobs, Ancoli-Israel, Parker, & Kripke (1989) recorded 24 hour sleep activity patterns of 19 of the residents from the same population as the previous study. Both

sleep and wake times were observed during every hour of the 24 hour recordings. Subjects slept for a mean total of 11.73 hours, and subjects slept an average of 36.49 minutes per hour during the time period from six pm to eight am and 19.27 minutes during eight am to six pm. Only six of the 19 subjects experienced a single full hour of consolidated time sleeping, and only two experienced two or more full hours of sleep, although nonconsecutively. The two patients with the most awake time accumulated five hours of wakefulness, which was fragmented throughout the 24 hour period. Six of the subjects did not experience a sustained hour of wakefulness, but slept some throughout the 24 hours.

The variability of sleep-wake patterns among individuals; good sleepers vs. poor sleepers; long sleepers vs. short sleepers, has been documented by researchers as summarized in Miles & Dement (1980). Recently, Bliwise, Bevier, Bliwise, Edgar, & Dement (1990) observed the sleep-wake behavior of 24 nursing home residents every 15 minutes, 24 hours a day for ten days, and documented a significant range of variability in the sleep-wake patterns of these subjects. Some subjects were awake for large portions of the night, and some were asleep for large portions of the day.

Still, the question persists of why the sleep of the elderly is more disturbed than a young person. The wide variability of sleep in the elderly complicates the ability of researchers to identify specific sleep disturbing factors. Some elderly people have sleep patterns similar to a young person and subjectively rate their sleep as very good, whereas other elderly people have very disturbed sleep. The variability in personalities, perceptions, and reactions of individuals to life events, makes it nearly impossible to designate specific factors which cause sleep disturbance. It appears that the elderly lack the motivation of need for regular time schedules of rising, sleeping, or eating; which makes external cues less definite in their lives (Miles & Dement, 1980; Colling 1983; Clapin-French, 1986; Morgan, 1987). Clapin-French (1986) commented that sensory impairment, which is common in the elderly, may decrease the sensitivity to external time cues, which maintain the regulatory biological rhythms.

Several studies have been done regarding sleep in hospitals, and how illnesses and the necessary care activities associated with the environment interrupts sleep, (Webster, & Thompson, 1986; Pacini, & Fitzpatrick, 1982), but very few studies have assessed the subjective assessment of sleep of residents in a long-term care facility.

Subjective Sleep Assessment and Polygraphic Criteria

Most evaluations of sleep have relied on the direct objective physiological measurements obtained through tridimensional monitoring. The electrographic parameters of electroencephalogram, electrooculogram and electromyelogram provide the most accurate means to assess sleep patterns (Chuman, 1983). Subjective evaluations of sleep, which utilize some form of a questionnaire or interview, provide a qualitative assessment of sleep as it is experienced by the individual. How the person feels about his sleep, whether it is restful and refreshing, or restless and disturbed can only be reported the individual who experiences it (Closs, 1988).

The comparison of subjective measurements do not always correspond directly with objective measurements. Several studies (Johns, 1971; Frankel, Course, Buchbinder & Snyder, 1976; Johns, 1976; Spiegel, 1981; Leigh, Bird, Hindmarch, Constable & Wright, 1988; and Morgan, Dallosso, Ebrahim, Arie & Fentem, 1988) have documented a reasonable degree of agreement between subjective estimates of sleep latency and total sleep time when compared with objective recordings. Spiegel (1981) compared subjective sleep assessment and polygraphic criteria of 23 women and 33 men, and concluded that the number, length, or duration of NREM-REM cycles were of no general significance for the quality of sleep. Individuals can provide a reasonably accurate estimate of their own sleep and are very sensitive to any changes in their sleep pattern (Webb, 1989; Morgan, Dallosso, Ebrahim, Arie & Fentem, 1988). Subjective reports of sleep give information relative to the psychological aspect of sleep which cannot be measured by objective methods. Therefore, the conclusion is that subjective reports provide more reliable information about some aspects of sleep than EEG recordings,

and EEG recordings provide more accurate information about other aspects of sleep (Johns, 1971).

Given the technical skills necessary and the cost of EEG equipment and laboratory time, objective measurements of sleep were not possible for this study. The qualitative measurement of sleep through the use of a questionnaire would enable a non-threatening and relatively easy method to be utilized to obtain information. If the sleep of the institutionalized elderly is to be improved, the sleep quality should first be assessed with an easy to use instrument which elicits valid information.

Summary

Since the early history of this world, men and women of learning have wondered about the role of sleep in human mental and physical health. The discovery of minute electrical activity from the brain and the development of EEG recordings provided researchers with new data about different stages during the sleep period. To attempt to understand the function or role of the various sleep stages, researchers deprived subjects of the different sleep stages to determine the result of its absence. A variety of deleterious maladies have been documented through this type of research. Sleep researchers have concluded that sleep is necessary, but it's exact function is still not fully understood. Four theories have been developed to explain the role of sleep and its purpose in humans, the restorative theory, the protective theory, the conservation theory and the instinctive theory. Each theory has its valid and scientific basis which helps to explain parts of the whole understanding about the nature of sleep.

As a person grows older the quality and quantity of sleep usually changes. Typically, the time it takes to fall asleep increases and the sleep period is fraught with frequent awakenings. Although the majority of elderly person complain of poor sleep, researchers also document those whose sleep is undisturbed by awakenings. This variability in sleep characteristics complicates understanding sleep in the elderly. Physical illnesses, emotional

stresses and changes in the sleep environment are some of the possible causes of disturbed sleep.

The increased use of nursing homes to care for the elderly presents new sleep disruption problems such as the loss of a familiar personal living environment, different regimens and routines, and noisy neighbors. Little research has been done regarding sleep of the elderly in a nursing home. Of that which has been done, findings suggest that sleep is very fragmented, and has a wide variability. It is apparent that there are disturbances of sleep in the elderly. Aging is associated with a greater amount of sleep disturbances than any or all other aspects of life (Webb, 1987). Age cannot be considered a cause, but secondary effects associated with age-related physical changes may be primarily responsible for the sleep disturbances (Webb, 1987).

The subjective assessment of sleep of nursing home residents has not been well documented by sleep researchers at this point. This study focused on obtaining the subjective assessment of sleep of the elderly in a long-term care facility and documenting factors which subjects believed adversely influenced their sleep. This data will provide more insight into the nature of sleep in this population, and will provide a basis on which to plan nursing care interventions to optimize the sleep of long-term care facility residents.

CHAPTER 3

METHODOLOGY

The purpose of this study was to describe the subjective assessment of sleep characteristics by elderly individuals in a long-term care facility. In addition, the subjects perception of sleep prior to and following admission to the long-term care institution was compared. Information about environmental factors which disrupted sleep was also solicited from the subjects.

Research Design and Statistical Analysis

An exploratory research design was used in this study. Descriptive statistics and measures of central tendency were used to describe the demographic characteristics of the sample and to examine self-reported subjective assessment of sleep of the elderly in a long-term care facility.

Setting

The setting was a non-profit, long-term care facility in a southwest U.S. city. The facility has 161 beds separated into four units with one unit reserved for severely demented patients.

Subjects

Prior to initiation of the study, Human Subjects approval was received from the Human Subjects Committee (Institutional Review Board) of the University of Arizona (Appendix A). Permission was also obtained from the Director of Nursing of the long-term care facility. The nursing staff was asked to provide names of individuals who met the criteria and who they believed would be willing to participate. After obtaining the names of potential subjects, each individual was approached, either in their room, hallway, or community room. A convenience sample consisting of 4 male and 16 female residents were invited to participate based on the following criteria:

1. Able to read, and speak English.
2. Fifty-nine years of age or older.

3. A resident in the long-term care facility for at least two weeks.

4. Cognitively aware of surroundings and demonstrate an intact memory as assessed by the ten point Short Portable Mental Status Questionnaire (SPMSQ) (Pfeiffer, 1975) (Appendix B). A score of six or greater was considered adequate mental orientation for informed consent.

Instruments

Short Portable Mental Status Questionnaire

The Short Portable Mental Status Questionnaire (SPMSQ) (Pfeiffer, 1975) (Appendix B), is a ten item instrument which evaluates short-term memory, long-term memory, orientation to surroundings, information about current events, and the capacity to perform serial mathematical tasks. Based on the Wechsler Memory Scale and the Kahn-Goldfarb Mental Status Questionnaire, the instrument was developed to detect the presence and degree of intellectual impairment. Standardized prompts were incorporated into the questionnaire to reduce the tendency to lead respondents in their responses.

Within this study, if a subject scored six or more on the SPMSQ, the Sleep Information Questionnaire (Appendix C) was administered. If a subject scored five or less on the SPMSQ, they were not included in the study.

Sleep Information Questionnaire

The Sleep Information Questionnaire, constructed by the investigator for this study, (Appendix C) was used to gather information regarding the subjective assessment of the individual's sleep. The Sleep Information Questionnaire was developed by reviewing other sleep questionnaires and deriving questions which would elicit information about the subjects perception of their sleep. Additional questions were written to solicit information about the person, exercise habits, sleep patterns at home, and sleep patterns in the nursing home. Information was sought regarding physical health, past and present use of sedatives, and environmental factors which may have interfered with their sleep. The subjects were asked to

state reasons why they believed their sleep had changed or was different now that they were living in the nursing home. Also, they were asked to indicate what the nurses/staff did to improve their sleep. Appendix D illustrates Sleep Information Questionnaire items grouped by factors.

Data Collection Procedure

Potential subjects were approached by the investigator and the purpose of the study explained. If willing to participate, subjects were escorted to their room, or a quiet area. A full explanation of the study, and a written consent form was provided (Appendix E). The SPMSQ (Appendix B) was administered to determine the mental status. Again with a score of six or greater, the Sleep Information Questionnaire (Appendix C) was then administered with assistance if necessary. The investigator sat with the subject, read out loud, along with the subject, the questions and choices, and wrote the answers as needed. Completion of the questionnaires required 15 to 30 minutes.

Upon completion of the questionnaires, or termination of the interview, subjects were thanked and returned to the pre-interview location if they desired.

Design Error and Limitations

The limitations of the study included: 1) data collection was limited to a single long-term care facility, and 2) subjects were not randomly selected, thus findings may not be generalizable to other long-term care facilities. Furthermore the selected long-term care home has a policy to awaken the resident every two hours during the night and escort them to the bathroom. This policy must be acknowledged as contributing to the fragmentation of sleep and may have influenced the subjects assessment of sleep quality and quantity.

CHAPTER 4

RESULTS

This chapter presents the findings of the study based on the research questions.

Description of the Sample

Twenty residents of the long-term care facility consented to participate in the research. The sample consisted of 16 females (80%) and four male (20%) (Table 1). Ages ranged from 59 to 93 years with a mean age of 79.9 years with a standard deviation of 9.84 years. Thirteen, of the subjects were widowed (65%), four were married (20%), one had never been married (5%), and two subjects were divorced (10%). The length of stay in the long-term care facility ranged from 60 days to 4745 days (13 years), with a mean of 1162 days (3.18 years), a median of 820 days (2.25 years), and a standard error of the mean of 242.6 days.

First Research Question

The first research question was: What is the subjective assessment of sleep of the elderly in a long-term care facility? This question was answered by the following data.

Subjective Assessment of Sleep in the Long-Term Care Facility

Question 12 addressed the subjective rating of sleep that the elderly perceived they were able to achieve now that they were living in the long-term care facility. Three of the subjects (15%) rated their sleep as very good, seven of the subjects (35%) rated their sleep as good, seven of the subjects (35%) rated their sleep as poor and three of the subjects (15%) rated their sleep as very poor.

Stated Reasons For Changes in Sleep

When the subjects were asked if their sleep had changed or was different since living in the long-term care facility, 13 of the subjects (65%) stated yes and seven of the subjects (35%) stated no. The reasons given for sleep being changed or different are listed as follows:

Because of all the medicines I have to take.

The staff have to turn me so often to keep away bedsores.

Table 1

Demographic Data of Sample

Subjects	n = 20 frequency	percentage
gender		
female	16	80
male	4	20
age		
59 to 62	3	15
63 to 73	0	0
74 to 79	4	20
80 to 86	9	45
87 to 93	4	20
marital status		
married	4	20
single	1	5
divorced	2	10
widowed	13	65
years in long-term care facility		
0 to 1 year	4	20
2 to 5 years	14	70
6 to 9 years	1	5
greater than 10 years	1	5

My sleep is different now only that I take sleeping pills.

My sleep isn't as good as when I was home.

I got older, therefore sleep isn't good now.

Because of the sleeping pills, I sleep better now.

I am awakened every two hours, but I sleep sounder.

The staff need training in how to turn people, it hurts when they turn me.

The noise disturbs my sleep.

The sleeping pills help me to sleep better.

Bladder problems bother me now and wake me up more at night.

The activity in the halls and other nursing care disturbs me.

I do not have my own choice of when to go to bed.

Having so many people around now make sleep worse.

I was active with social activities before and was tired when I got home and went right to sleep. Now I don't do things and don't really get tired.

Noise and physical discomforts now bother my sleep.

I don't know where I am at all the time, and I don't like anything here.

Based on these data, it appears that the majority of subjects sleep quality and quantity changed since entering the long-term care facility.

Second Research Question

The second research question was "How do the sleep characteristics differ when compared to sleep characteristics prior to admission to the long-term care facility?

It was discovered during data collection that it was difficult to focus the subjects thinking to a time frame of one year prior to coming into the long-term care facility. Most reflected to a time in midlife when they were still gainfully employed. It was also difficult for the subjects to remember details about their at home bedtime, asleep time and awake in the morning time.

Therefore, the validity of some of the comparisons may be less than accurate, even though the subjects were considered mentally capable to answer the questions.

Subjective Rating of Sleep at Home Versus Long Term Care Facility

Table 2 includes comparison data of the subjective assessment of sleep of each individual at home and in the long-term care facility. Nine of the subjects rated their sleep in the long-term care facility as being the same, nine of the subjects rated their sleep as worse, and two of the subjects rated their sleep as better.

Comparison of Bedtime

When asked about the time they went to bed at home, several of the subjects, (35%) could not remember their home bedtime. Of the remaining subjects who could remember, the bedtimes ranged from 10 pm to midnight. The most frequently stated home bedtime was between 10:00 and 10:29 pm. The median time was 10:45 pm.

Since living in the long-term care facility, the range of subjects responses was that they went to bed from 6:30 to 10:29 pm. The most frequently occurring time (n = 3) was 10:00 to 10:29 pm, although the median was 9:15 pm.

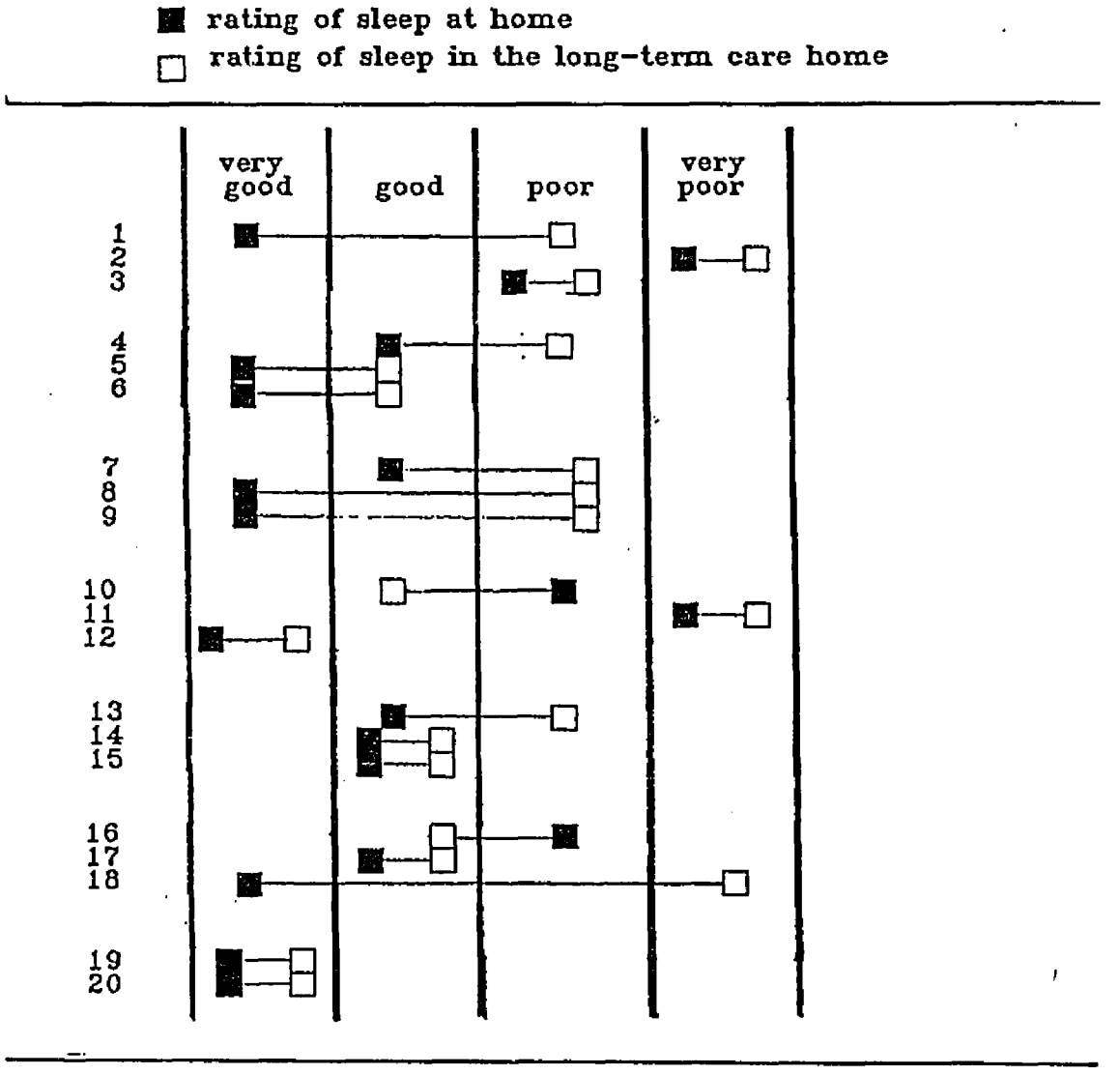
Comparison of Asleep Time

The question of falling asleep time at home versus present was difficult to assess due to considerable missing data, i.e., 50% were unable to answer or recall. At home, subjects stated that they fell asleep within 45 minutes of going to bed. In the long-term care facility, the delay is 90 minutes, and the range of asleep times was 8:30 pm to 1:00 am.

Overall, subjects went to bed at an earlier hour now that they were living in the long-term care facility. About half of the subjects settled down to go to sleep within 30 minutes of going to bed. Table 3 illustrates these data and also shows the comparison of stated bedtimes and fall-asleep times of the subjects at home and now in the long-term care facility. The data represents subjects (n = 10) who could answer all aspects of the questions.

Table 2

Subjective rating of sleep at home compared with how the same subject rated their sleep in the long-term care facility



Comparison of Awake Time

The question of awake time and getting out of bed and dressed in the morning at home versus now in the long-term care facility again resulted in some subjects not remembering details about their sleep-wake patterns.

Overall, subjects awakened and got out of bed at home at the same time or with little delay as awakening. In the long-term care facility there was a delay of 1 hour and 45 minutes from awake time to getting out of bed and dressed. This was most likely due to the subjects dependence on the nursing staff to care for and assist them. Table 4 illustrates the data of the subjects (n = 12) who could recall past experience relative to the stated question.

Comparison of Sleeping Medication Use

Comparing the use of sleeping medication at home versus in the long-term care facility, only three subjects took sleeping medication at home. Of those three, two had continued to take sleeping medication. In the long-term care facility nine of the subjects were currently taking sleeping medication.

Third Research Question

The third research questions was "What are the environmental factors which affected sleep?"

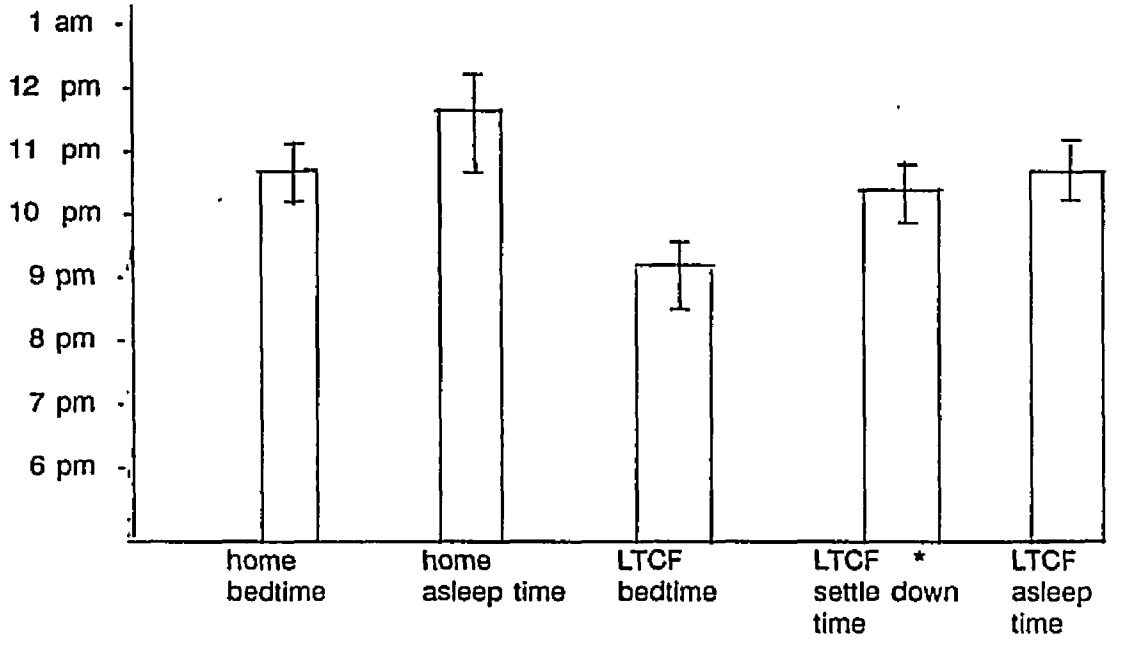
The long-term care facility used in this research routinely awakened the residents every two hours during the night in an effort to reduce the incidence incontinence. To assess if this policy effected the subjects sleep, and to discover what other occurrences awakened the subjects, the next four topics were addressed.

Staff Awakenings

The question was asked "How many times do the nurses/staff wake you up to care for you during the night?" Almost half (45%) of the subjects were awakened during the night for

Table 3

Comparison of the stated mean bedtimes and mean fall asleep times of the subjects at home and in the long-term care facility



I = Standard Error of the Mean

* Settledown time in Long-Tern Care Facility is incidental information

some kind of nursing care. Two subjects reported one awakening, three reported two awakenings, one subject reported four awakenings and one reported five awakenings per night. Those subjects who were able to control continence were not awakened during the night. The question did not solicit whether this practice of awakening patients was for incontinence control or for other necessary care, therefore, it is not possible to assess the effect of the every two hour awakenings.

Noise Awakenings

Noise during the night was the stated reason for awakening by 11 subjects. Five of these subjects reported three or less awakenings while six reported up to eight awakening per night. It can be concluded that whereas some subjects were awakened only a few times, others were awakened numerous times.

Awakenings for Other Reasons

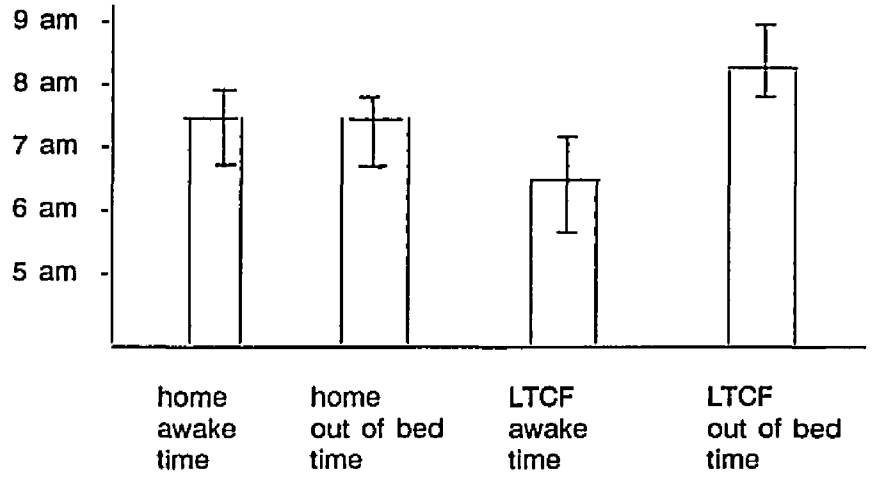
To assess if there were reasons other than nursing care and noise that awakened the subjects, the question was asked "How many other times do you wake up during the night?". Even though nine of the subjects reported no other awakenings, the majority (n = 11) reported up to six awakenings during the night. A follow up questions was: "If you are awakened during the night, do you have trouble going back to sleep? Eleven of the subjects (55%) stated that once awakened by nursing care, noise or other reason, they did have difficulty returning to sleep. Clearly over half of the subjects reported difficulty returning to sleep once awakened. Table 5 illustrates the numerical data associated with awakenings during the night for each subject. Overall, the majority of subjects had difficulty returning to sleep once awakened and half of the subjects rated their sleep as poor.

Additional Information

Some of the questions on the sleep questionnaire did not address the three research questions directly, but contributed important information to assist in understanding other factors

Table 4

Comparison of stated mean awake time and mean getting out of bed and dressed of the subjects at home and in the long-term care facility



I = Standard Error of the Mean

which affect the sleep patterns of long-term care facility residents. The following data represent information which helped complete the data of factors which effect the sleep pattern.

Nap Pattern and Nap History

Evaluating the nap patterns of the subjects assisted with understanding of the daily sleep pattern of each subject. Several questions (number 24 through 31), were related to information about the nap pattern of the subject. Only nine of the 20 subjects (45%) took naps, five subjects went to bed for their nap, two subjects napped only in a chair, and two subjects napped either in their bed or in a chair. Two of the nine nappers took naps either in the morning or the afternoon, two subjects napped only in the morning, and three of the subjects napped only in the afternoon. Two of the subjects did not list a nap time. None of the subjects stated they took a nap in the evening.

Two questions addressed whether subjects napped because they were tired or bored. Of the nine nappers, three stated they napped only because they were tired, one only because they were bored, and five subjects napped because they were either bored or tired.

When asked for other reasons that the subjects may nap, one subject stated that pain during the night disturbed their sleep resulting in their begin tired during the day, and one other subject stated that they rested in bed during the day, but did not nap.

Overall, the majority of subjects in this study did not take naps. Those who did nap, tended to do so both in the morning and afternoon.

Sleeping Medication Use and Subjective Rating of Sleep

Because of the small sample size, it is difficult to draw conclusions, but it is interesting to note that none of the nine subjects who now currently took sleeping medication rated their sleep as very good. Three subjects rated their sleep as good, three as poor, and three as very poor. These data are illustrated in Table 6. The conclusion is that those subjects ingesting

Table 5

Each subjects subjective rating of sleep in the long-term care facility, the frequency of awakenings during the night due to nursing staff, noise, and other reasons; and if difficulty returning to sleep

Subject number	Subjective rating of sleep	Awakenings due to Staff	Awakenings due to Noise	Awakenings due to Other	Total awakenings	Difficulty returning to sleep
1	poor	1	1	0	2	yes
2	very poor	0	6	3	9	yes
3	poor	1	0	0	1	yes
4	poor	0	8	0	8	yes
5	good	0	0	2	2	no
6	good	3	0	0	3	no
7	poor	5	1	0	6	no
8	poor	0	0	2	2	no
9	poor	0	8	5	13	yes
10	good	2	0	5	7	no
11	very poor	0	0	1	1	yes
12	very good	0	3	0	3	no
13	poor	0	0	6	6	yes
14	good	2	0	2	4	no
15	good	1	2	0	3	yes
16	good	4	4	0	8	yes
17	good	0	4	1	5	yes
18	very poor	0	8	3	11	yes
19	very good	0	0	0	0	no
20	very good	3	3	0	6	no

sleeping medication rated their sleep as being poorer than those not taking sleeping medication. It has been documented that the use of sleeping medication resulted in reduced REM sleep periods and a marked reduction of stage 3 and 4 sleep. It appears that the rating of sleep reflects this disturbance due to chronic sleeping medication use.

Sleeping Medication and Returning to Sleep

Of the nine subjects who were taking sleep medication, six stated they had difficulty returning sleep if awakened at night. Likewise, of the 11 who did not take sleeping medication, only four subjects had difficulty returning to sleep. It appears that subjects who take sleeping medication had more difficulty returning to sleep than those who did not take sleeping medication. This is consistent with research data which has documented sleep difficulties with chronic use of sleeping medication use.

Length of Stay

The length of stay in the long-term care facility, when compared with how each subject rated their sleep (question 12), did not reveal a pattern, that is, sleep did not appear to improve or deteriorate based on length of stay.

Physical Activity in the Care Home

The majority of subjects (n = 14) were physically limited to being bedbound or chairfast. Of the six (30%) subjects who could walk, three occasionally walked inside the building, one occasionally walked outside, and two frequently walked outside each day. It was observed that most of the chairfast subjects were taken outside each day, weather permitting.

Hours of Sleep of Subjects in Long-Term Care Facility

The mean number of hours slept in the long-term care facility was reported to be eight hours with a range of 5 to 10 hours. In an attempt to determine if the subject's reported total number of hours of slept was similar to the actual number of hours slept, data from asleep time in long-term care facility, wake up in the morning and stated hours slept (questions 15, 16 & 18) was evaluated. These data illustrated that ten subjects stated they slept fewer hours than

what they actually slept, three subjects stated they slept the same number of hours as what they actually slept, and three subjects stated they slept a greater number of hours than what they actually slept.

Hours of Sleep Needed to Feel Refreshed

The question of "How many hours of sleep do you need to feel refreshed?" revealed that the mean number of hours needed was 7.647 with a standard deviation of 1.498 hours and a median of eight hours. A close similarity existed between the subject's calculated hours of sleep, the stated hours of sleep obtained, and the stated hours of sleep needed to feel refreshed.

Physical and Emotional Problems Which Disturb Sleep

When asked about physical problems that may disturb their sleep, one-half of the subjects stated that medical problems directly disturbed their sleep. Of the medical maladays that afflicted the subjects, eleven of the subjects stated that pain of some type interfered with their sleep. Multiple sclerosis afflicted three of the subjects, and arthritis pain afflicted five.

Emotional difficulties which interfered with sleep affected 13 (65%) of the subjects. The stated emotional complaints of the subjects were:

I am bored and want to get out of this place.

The noise at night wakes me up.

I feel a lot of empathy for the other neighbors who are sick, and that keeps me awake.

I worry about my husband.

I have no family left so my worries are gone.

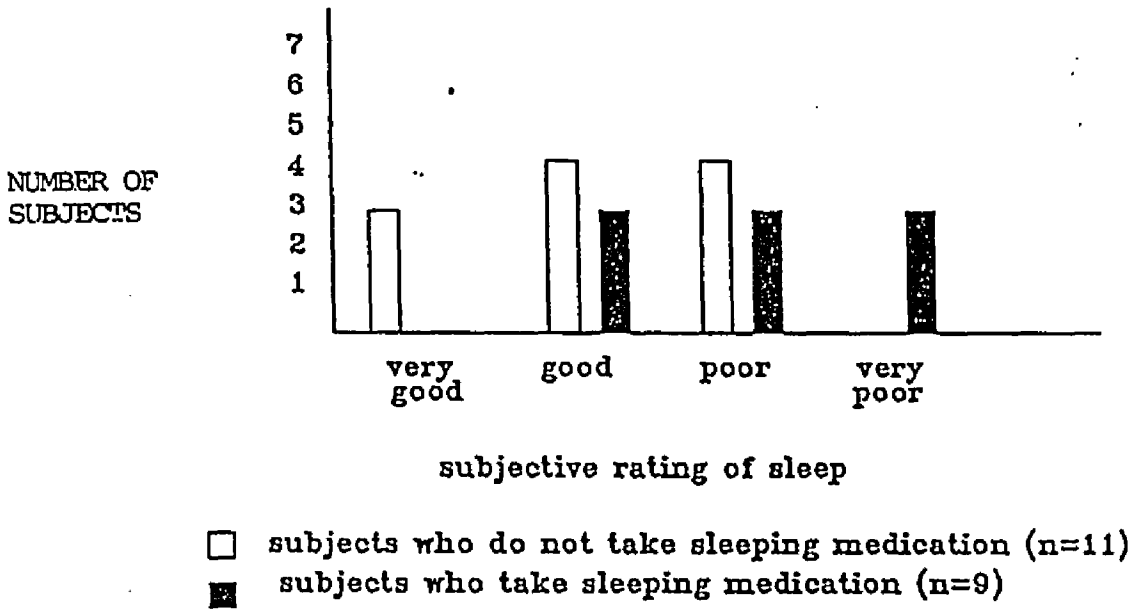
I am nervous.

I think of a lot of things, including the surgery I just had and if things got fixed right.

I just worry about things.

Table 6

Frequency of subjective rating of sleep of subjects who do not and who do take sleeping medication



I am depressed.

I cry a lot because I am all alone.

There seemed to be a disheartened feeling of aloneness, and a hopelessness of abandonment to one's fate being expressed through these comments.

Reasons Outside of the Long-Term Care Facility Which Interfere With Sleep

When the subjects were asked if there were reasons outside of the long-term care facility that interfered with their sleep, sixteen of the subjects stated no. One subjects statement of "No, the nursing home becomes your world", seems to be a statement which represented a feeling of the majority of the subjects. Some of the other comments were as follows:

I would like to die sometimes.

I have no family here, only one friend.

I am aggravated at my present situation.

I have no control over being sick and just want it to end.

Sometimes I worry about my children.

Suggestions for Improving Sleep

When the subjects were asked for their suggestions as to what could the nursing staff do to help improve their sleep, nine of the subjects did not have any suggestions, the other 11 subjects stated:

If you complain to the Head Nurse, she gets the staff in trouble and they take it out on you, therefore, one learns quickly that if you are nice to the staff and do not complain, they will let you do what you want.

I have some stress from the aides not being very kind. It causes unnecessary stress.

If the nurses could put me to bed, I could sleep. The nurses do things to me because I can not move around on my own and there is nothing I can do about it.

It would help me sleep if the nurses could dim the lights at night.

If I could be turned more comfortably.

I feel as if I am low person on the totem pole, I can't make suggestions, you learn not to.

No suggestions, they give me my pills as I ask.

Control the noise.

For the staff to talk softer at night, do not bang the doors.

To not turn on the overhead lights when my roommate needs care at night.

No suggestions, I wish they would cover me up if my blankets are off.

I don't know of anything they need to do to improve my sleep.

It seems like people do not want to bother with me.

Summary

The 16 female and four male subjects who participated in the study averaged 79.9 years of age with a mean length of stay in the long-term care facility of 3.18 years. Seventy percent of the subjects were bedbound or chairfast.

It was difficult for some of the subjects to remember details about their sleep at home. Most of the subjects rated their sleep at home as good to very good. Compared with living in the long-term care facility, the majority of subjects rated their sleep as poor or very poor. The bedtime at home was later than in the long-term care facility. With most of the subjects dependent upon the nursing staff for mobility and care, individual desires for bedtime and awake time became secondary to staff needs to coordinate nursing care.

When the subjects were asked how may hours of sleep they needed to feel refreshed, the answers were very close to the actual number of hours of sleep they obtained. A majority of the subjects were awakened during the night by the nursing staff, or because of noise, or some other unstated reasons.

Nap patterns showed that only nine of the 20 subjects took naps. One subject stated that he/she napped because of sleep disturbing pain during the night. A majority (75%) of the subjects, stated that either a medical problem or an emotional problem caused them to have

difficulty with sleep. Sleeping medication use increased among the subjects since moving into the long-term care facility.

Overall, the subjects subjective rating of sleep was that their sleep was worse now that they were living in the long-term care facility than when they were living at home. Both medical and emotional problems afflicted the subjects sleep.

CHAPTER 5

DISCUSSION AND CONCLUSIONS

The findings associated with the conceptual framework, the limitations of the study, implications for nursing practice, and implications for further research are presented in this chapter.

Findings Associated with the Conceptual Framework

It was proposed that the subjective assessment of sleep by elderly individuals in a long-term care facility was influenced by physiological, psychological, environmental factors, and length of stay within the facility. Based on the findings of this study, approximately 50% of the subjects rated their sleep in the long-term care facility being the same and 50% of the subjects indicated their sleep has deteriorated. Bed times, as reported by by Clapin-French (1986), were found in this study to be earlier than at home bedtimes. Awakenings during the night were primarily due to noise and other nursing activities. This is consistent with research findings of Ancoli-Israel (1989) and Clapin-French (1986).

The concept of physiological factors effecting sleep was partially supported in that ten of the 20 subjects stated that medical problems did disturb their sleep. Several researchers, Kales and Kales (1974), Carskadon & Dement (1981), Collins (1983), Dement et at. (1985), Hoch & Reynolds (1986), mentioned physical problems as possibly a factor contributing to sleep difficulties, but not the primary factor.

Psychological factors effected the sleep of 13 of the 20 subjects, and 15 of the 20 subjects stated that either a medical problem or an emotional problem had a detrimental effect on their sleep. This finding is consistent with research done by Colling (1983), Hoch & Reynolds (1986), Billard and Besset (1987), Karacan & Williams (1983), Reynolds, Kupfer & Sewitch (1984), Clapin-French (1986) and Miles & Dement (1980).

A surprising finding was the small number of subjects who stated they napped during the daytime; nine out of 20 subjects. One could speculate that since this sample was selected

from mentally alert residents, that perhaps they kept active with activities negating the desire to nap because of boredom.

The high incidence of using sleeping medication was an area of concern. Forty-five percent of the subjects were now taking sleeping medication whereas only 15% took sleeping medications prior to living in the long-term care facility, and the majority of subjects rated their sleep as poor or very poor. The concern is related to the research documented disruptions of the sleep cycle with chronic use of sleeping medications, yet the high number of subjects given sleeping medication among this small sample size was disconcerting. One recommendation for further study would be to determine what the sleep medication was and if other ingested medication could have contributed to sleep disturbances.

The number of hours of sleep the subjects indicated they needed to feel refreshed was surprisingly close to the actual number they slept. However, direct observations of the subjects would be the best way to document sleep-wake activity.

Limitations of the Study

The primary limitations of the study were the small sample size and non-randomized sample selection. The convenience sampling further limited the true crosssection population of the long-term care facility. Mentally alert residents are a significant minority of the whole. Self-reporting answers to a questionnaire is another limitation of the study. The fact that some of the subjects could not remember details about their sleep patterns is another limitation of the study. The questionnaire gathered the information sought, but the convenience sampling of a mentally alert group eliminated a large portion of the residents. If one was able to inconspicuously observe individuals throughout a 24 hour period, a more accurate record of the sleep-wake cycle would have been obtained.

Implications for Nursing Practice

Since the sample size was small, more work must be done before implications for nursing practice can be fully explored. Two things should be mentioned. The subjects

interviewed for this research study were adversely affected by the noise and disturbing behavior of disoriented residents. What this implies is that mentally alert, but physically dependent, residents need a separate sleeping area. Activities and patient care needs during the night do generate noise as was noted from comments received as reasons for changes in sleep. The evening and night nursing staff should be cognizant of the need to maintain a quiet environment. Noise and conversations, during the night hours, are more disturbing than during the day.

With most of the subjects being dependent upon the nursing staff for mobility and care, which necessitated their moving into the long-term care facility, individual desires may be considered, but the balancing of work needs of the nursing staff dictates when an individual gets the care needed. A recommendation would be to have monthly care conferences directed by the Head Nurse with the residents. This would allow the resident input into their care, a format for expressing complaints, and allow the nurse to explain and coordinate the plan of care. Many residents expressed a frustration with not having any control over their activities and a frustration over disturbing events with no outlet to express these concerns without reprisal in their nursing care.

A related masters thesis by Edith Ann Bell Steele, (1986) Entrapment: A passage into despair in long-term care facilities, documented a cycle of events among the residents leading to a feeling of despair. From loosing friends, home, possessions, health, dignity and loosing control over events effecting their lives, a feeling of despair dominates their lives. This feeling of despair was also observed in subjects in this research. This author recommends that persons working in or contemplating research in a long-term care facility read the above referenced thesis.

Patient suggestions as to how the nurses could improve the sleep of the elderly in a long-term care facility are feasible. Being sensitive and caring with these people takes initiative

and dedication. Primarily the preservation of quietness in the area and the sensitive performance of nursing care could make a difference.

Recommendations for Further Research

Replication of the study with a larger sample size is recommended. Because the study was completed at one long-term care facility, the data may not be representative of the population of other long-term care facilities. For further study, broadening the sample size and increasing the number of sites and sample size is recommended to gain more objectivity and trustworthy data.

APPENDIX A

HUMAN SUBJECTS APPROVAL

THE UNIVERSITY OF
ARIZONA
HEALTH SCIENCES CENTER

1690 N. Warren (Bldg. 526B)
Tucson, Arizona 85724
(602) 626-6721 or 626-7575

n Subject Committee
October 18, 1990

Donald E. Johnson, R.N.
c/o Leanna Crosby, D.N.Sc., R.N.
College of Nursing
Arizona Health Sciences Center

RE: HSC A90.148 DESCRIPTION OF SUBJECTIVE ASSESSMENT OF SLEEP CHARACTERISTICS BY ELDERLY INDIVIDUALS IN A LONG-TERM CARE FACILITY

Dear Mr. Johnson:

We received your revised consent form for your above referenced project. The procedures to be followed in this study pose no more than minimal risk to participating subjects. Regulations issued by the U. S. Department of Health and Human Services [45 CFR Part 46.110(b)] authorize approval of this type project through expedited review procedures, with the condition(s) that subjects' anonymity be maintained. Although full Committee review is not required, a brief summary of the project procedures is submitted to the Committee for their endorsement and/or comment, if any, after administrative approval is granted. This project is approved for a period of one year effective 18 October 1990.

The Human Subjects Committee (Institutional Review Board) of the University of Arizona has a current assurance of compliance, number M-1233, which is on file with the Department of Health and Human Services and covers this activity.

Approval is granted with the understanding that no further changes or additions will be made either to the procedures followed or to the consent form(s) used (copies of which we have on file) without the knowledge and approval of the Human Subjects Committee and your College or Departmental Review Committee. Any research related physical or psychological harm to any subject must also be reported to each committee.

A university policy requires that all signed subject consent forms be kept in a permanent file in an area designated for that purpose by the Department Head or Comparable authority. This will assure their accessibility in the event that university officials require the information and the principal investigator is unavailable for some reason.

Sincerely,

William F Denny

William F. Denny, M.D.
Chairman
Human Subjects Committee

WFD:rs
cc: Departmental/College Review Committee

APPENDIX B

SHORT PORTABLE MENTAL STATUS QUESTIONNAIRE (SPMSQ)

SHORT PORTABLE MENTAL STATUS QUESTIONNAIRE (SPMSQ)
(Pfeiffer, 1975)

Subject #_____

Ask questions 1-10 and record all answers. (Ask questions 4a only if subject has no telephone.) Total the numbers of errors and correct responses based on ten questions.

1. What is the date today? _____
   month day year

2. What day of the week is it? _____

3. What is the name of this place? _____
   *** prompt: The place in which you are now residing.**

4. What is your telephone number? _____

   a. (ask only if subject does not have a phone).
   What is your street address? _____

5. How old are you? _____

6. When were you born? _____
   month day year
   prompt: What is your birthdate and the year you were born?

7. Who is the president of the U. S. now? _____
   prompt: He was vice-president with the president before him.

8. Who was the president before him? _____
   prompt: The movie actor?

9. What was your mother's maiden name? _____

10. Subtract 3 from 20 and keep subtracting 3 from each number you get, all the way down. Correct answer is _____
    17 14 11 8 5 2
    prompt: Take 20 minus 3 and keep minusing 3 from each new number you get.

Instructions for scoring SPMSQ:

0-2 errors/8-10 correct = intact
3-4 errors/6-7 correct = mild intellectual impairment
5-7 errors/3-5 correct = moderate intellectual impairment
8-10 errors/0-2 correct = severe intellectual impairment

*Prompts were added and are not contained in the original instrument.

APPENDIX C
SLEEP INFORMATION QUESTIONNAIRE

SLEEP INFORMATION QUESTIONNAIRE

Subject # _____ Column # 1-3

Please circle or fill in the answer.

code/value

1. Gender: _____ 4
   - A. Female (1)
   - B. Male (2)

2. Age? _____ _____ 5-6

3. Marital status? _____ 7
   - Married (1)
   - Never Married (2)
   - Divorced (3)
   - Widowed (4)

4. *How long have you lived in this Care Home?* _____ 8-11

5. How much physical exercise do you get? _____ 12
   - primarily bedbound or chairfast (1)
   - walking inside building occasionally (2)
   - walking inside building frequently each day (3)
   - walking outside building occasionally (4)
   - walking outside building frequently each day (5)

THINK BACK TO A TIME WHEN YOU WERE HOME

6. When you lived at Home, were you a: _____ 13
   - Very good sleeper. (1)
   - Good sleeper. (2)
   - Poor sleeper. (3)
   - Very poor sleeper. (4)

7. When you lived at Home, what time did you go to bed at night? _____ 14
   - 8:00 pm - 8:29 pm (1)
   - 8:30 pm - 8:59 pm (2)
   - 9:00 pm - 9:29 pm (3)
   - 9:30 pm - 9:59 pm (4)
   - 10:00 pm - 10:29 pm (5)
   - 10:30 pm - 10:59 pm (6)
   - 11:00 pm - 11:29 pm (7)
   - 11:30 pm - 11:59 pm (8)
   - 12:00 am - 12:29 am (9)

8. When you lived at Home, what time did you fall asleep at night? _____ 15

8:00 pm - 8:29 pm	(1)
8:30 pm - 8:59 pm	(2)
9:00 pm - 9:29 pm	(3)
9:30 pm - 9:59 pm	(4)
10:00 pm - 10:29 pm	(5)
10:30 pm - 10:59 pm	(6)
11:00 pm - 11:29 pm	(7)
11:30 pm - 11:59 pm	(8)
12:00 am - 12:29 am	(9)

9. When you lived at Home, what time did you wake up in the morning and stay awake? _____ 16

before 5 am	(1)
5:00 am - 5:29 am	(2)
5:30 am - 5:59 am	(3)
6:00 am - 6:29 am	(4)
6:30 am - 6:59 am	(5)
7:00 am - 7:29 am	(6)
7:30 am - 7:59 am	(7)
8:00 am - 8:29 am	(8)
8:30 am - 8:59 am	(9)

10. When you lived at Home, what time did you get out of bed in the morning and get dressed? _____ 17

before 5 am	(1)
5:00 am - 5:29 am	(2)
5:30 am - 5:59 am	(3)
6:00 am - 6:29 am	(4)
6:30 am - 6:59 am	(5)
7:00 am - 7:29 am	(6)
7:30 am - 7:59 am	(7)
8:00 am - 8:29 am	(8)
8:30 am - 8:59 am	(9)

11. When living at Home, did you take medication to help you sleep? _____ 18

YES (1) NO (2)

NOW THAT YOU ARE LIVING IN THE NURSING HOME

12. Since living in the Care Home, are you a: _____ 19

Very good sleeper.	(1)
Good sleeper.	(2)
Poor sleeper.	(3)
Very poor sleeper.	(4)

13. Since living in the Care Home, what time do you go to bed at night? ____ 20

6:00 pm - 6:29 pm	(1)
6:30 pm - 6:59 pm	(2)
7:00 pm - 7:29 pm	(3)
7:30 pm - 7:59 pm	(4)
8:00 pm - 8:29 pm	(5)
8:30 pm - 8:59 pm	(6)
9:00 pm - 9:29 pm	(7)
9:30 pm - 9:59 pm	(8)
10:00 pm - 10:29 pm	(9)

14. Since living in the Care Home, what time do you settle down (ie. turn off the light, TV or radio) at night to go to sleep? ____ 21

8:00 pm - 8:29 pm	(1)
8:30 pm - 8:59 pm	(2)
9:00 pm - 9:29 pm	(3)
9:30 pm - 9:59 pm	(4)
10:00 pm - 10:29 pm	(5)
10:30 pm - 10:59 pm	(6)
11:00 pm - 11:29 pm	(7)
11:30 pm - 11:59 pm	(8)
12:00 am - 12:29 am	(9)

15. Since living in the Care Home, what time do you fall asleep at night? ____ 22

8:00 pm - 8:29 pm	(1)
8:30 pm - 8:59 pm	(2)
9:00 pm - 9:29 pm	(3)
9:30 pm - 9:59 pm	(4)
10:00 pm - 10:29 pm	(5)
10:30 pm - 10:59 pm	(6)
11:00 pm - 11:29 pm	(7)
11:30 pm - 11:59 pm	(8)
12:00 am - 12:29 am	(9)

16. Since living in the Care Home, what time do you wake up in the morning and stay awake? ____ 23

before 5 am	(1)
5:00 am - 5:29 am	(2)
5:30 am - 5:59 am	(3)
6:00 am - 6:29 am	(4)
6:30 am - 6:59 am	(5)
7:00 am - 7:29 am	(6)
7:30 am - 7:59 am	(7)
8:00 am - 8:29 am	(8)
8:30 am - 8:59 am	(9)

17. Since living in the Care Home, what time do you get out of bed in the morning and get dressed? _____ 24

before 5 am	(1)
5:00 am - 5:29 am	(2)
5:30 am - 5:59 am	(3)
6:00 am - 6:29 am	(4)
6:30 am - 6:59 am	(5)
7:00 am - 7:29 am	(6)
7:30 am - 7:59 am	(7)
8:00 am - 8:29 am	(8)
8:30 am - 8:59 am	(9)

18. How many hours or sleep do you get (on the average) in the Care Home? _____ 25

5 hours	(1)
6 hours	(2)
7 hours	(3)
8 hours	(4)
9 hours	(5)
10 hours	(6)

19. How many hours of sleep do you need to feel refresher? _____ 26

5 hours	(1)
6 hours	(2)
7 hours	(3)
8 hours	(4)
9 hours	(5)

20. How many times do the nurses/staff wake you up to care for you during the night? _____ 27

1 time	(1)
2 times	(2)
3 times	(3)
4 times	(4)
5 times	(5)
6 times	(6)
7 times	(7)
8 times	(8)
9 times	(9)

21. How many time are you awakened by noise during the night? _____ 28

1 time	(1)
2 times	(2)
3 times	(3)
4 times	(4)
5 times	(5)
6 times	(6)
7 times	(7)
8 times	(8)

22. How many other times do you wake up during the night? _____ 29

not once	(1)
1 time	(2)
2 times	(3)
3 times	(4)
4 times	(5)
5 times	(6)
6 times	(7)
7 times	(8)
8 times	(9)

23. If you are awakened during the night, do you have trouble going back to sleep? _____ 30
YES (1) NO (2)

24. Do you nap in bed during the day? _____ 31
YES (1) NO (2)

25. Do you nap in a chair during the day? _____ 32
YES (1) NO (2)

26. Do you nap in the morning? _____ 33
YES (1) NO (2)

27. Do you nap in the afternoon? _____ 34
YES (1) NO (2)

28. Do you nap in the evening? _____ 35
YES (1) NO (2)

29. Do you nap because you are tired? _____ 36
YES (1) NO (2)

30. Do you nap because you are bored? _____ 37
YES (1) NO (2)

31. Other reason you nap:_____ _____
_____

32. Do you have something physically wrong with you that interferes with your sleep? _____ 38
YES (1) NO (2)

33. What is it? _____

_____
_____
_____

34. Do you have something emotionally wrong with you that interferes with you sleep? _____39
YES (1) NO (2)

35. What is it? _____

_____
_____
_____
_____

36. Since living in the Care Home, do you take medication to help you sleep? _____40
YES (1) NO (2)

37. Do you feel that you sleep has changed or is different since living in the Care Home? _____41
YES (1) NO (2)

Why? _____

_____
_____
_____
_____

38. What could the nurses/staff do to help improve your sleep? _____

_____
_____
_____
_____

39. Are there reasons outside the Care Home that interfere with your sleep? _____

_____
_____
_____
_____

APPENDIX D
SLEEP INFORMATION QUESTIONNAIRE ITEMS GROUPED BY FACTORS

Sleep Information Questionnaire Items Groups by Factors

QUESTIONS ABOUT HOME

ENVIRONMENT	PHYSIOLOGICAL	PSYCHOLOGICAL	LENGTH OF STAY
7-bedtime	11-sleep medication	6-sleep judgment	
8-fall asleep			
9-wake up and stay awake time			
10-out of bed and dressed			

QUESTIONS ABOUT LONG-TERM CARE FACILITY

ENVIRONMENT	PHYSIOLOGICAL	PSYCHOLOGICAL	LENGTH OF STAY
13-bedtime	29-nap because tired	12-sleep judgment	4-length of stay
14-seattle down	32-physically wrong	19-hours of sleep to feel refreshed	
15-fall asleep	33-what is physical ailment	29-nap because bored	
16-wake up and stay awake	36-sleep medication	31-other reason for nap	
17-out of bed and dressed		34-emotional wrong	
20-times staff awaken you		35-what is emotional ailment	
21-times noise awakens you		37-has sleep changed	
		39-outside reason that interferes with sleep	

QUESTIONS WHICH OVERLAP CATEGORIES

ENVIRONMENT	PHYSIOLOGICAL	PSYCHOLOGICAL	LENGTH OF STAY
18-hours of sleep	18-hours of sleep		
22-other reasons for awakenings	22-other reasons for awakenings	22-other reasons for awakenings	
	23-trouble returning to sleep	23-trouble returning to sleep	
24-nap in bed	24-nap in bed	24-nap in bed	
25-nap in chair	25-nap in chair	25-nap in chair	
26-nap in morning	26-nap in morning	26-nap in morning	
27-nap in afternoon	27-nap in afternoon	27-nap in afternoon	
28-nap in evening	28-nap in evening	28-nap in evening	
38-what could staff do to improve sleep	38-what could staff do to improve sleep	38-what could staff do to improve sleep	

APPENDIX E
SUBJECTS CONSENT FORM FOR RESEARCH PROJECT

The University of Arizona
College of Nursing

Subject Consent

Description of Subjective Assessment of Sleep Characteristics by Elderly Individuals in a Long-Term Care Facility

I AM BEING ASKED TO READ THE FOLLOWING MATERIAL TO ENSURE THAT I AM INFORMED OF THE NATURE OF THIS RESEARCH STUDY AND HOW I WILL PARTICIPATE IN THE STUDY, IF I CONSENT TO DO SO. SIGNING THIS FORM WILL INDICATE THAT I HAVE BEEN SO INFORMED AND THAT I GIVE MY CONSENT. FEDERAL REGULATIONS REQUIRE WRITTEN INFORMED CONSENT PRIOR TO PARTICIPATION IN THIS RESEARCH STUDY SO THAT I CAN KNOW THE NATURE AND THE RISKS OF MY PARTICIPATION AND CAN DECIDE TO PARTICIPATE OR NOT PARTICIPATE IN A FREE AND INFORMED MANNER.

PURPOSE

I am being invited to voluntarily participate in a research study to gain a better understanding of how people believe they sleep in a long-term care facility.

SELECTION CRITERIA

I am being invited to participate because I am at least 65 years old, can speak and read English, and have been living in this long-term care facility for at least two weeks. A total of 30 people will be asked to be a part of this research.

STANDARD TREATMENT

If I decide not to participate in this study, my relationship with the doctors or nurses at the long-term care facility, or the person doing this research will not in any way be affected. The care I receive will not be affected in any way if I decide to participate or not to participate.

PROCEDURE

If I agree to be a part of this study, I will:

1. Answer questions that will test my memory and knowledge of current events.

2. Answer questions about my sleep since coming to live in this long-term care facility.

3. Answer questions about my sleep at home before coming to live in this long-term care facility.

It will take about 30 minutes of my time to answer all of the questions.

RISKS

There are no risks if I participate in this research.

BENEFITS

There are no benefits to me for participating in this study. Information may be learned about how people who are living in a long-term care facility believe they sleep.

CONFIDENTIALITY

My name will not be on the questionnaires. A code number will be written on the forms and only the investigator, Donald Johnson, and his thesis advisor, Leanna Crosby, R.N., D.N.Sc., will have access to the questionnaires.

PARTICIPATION COSTS

There will be no cost if I participate in this study.

AUTHORIZATION

BEFORE GIVING MY CONSENT BY SIGNING THIS FORM, THE METHODS, INCONVENIENCES, RISKS, AND BENEFITS HAVE BEEN EXPLAINED TO ME AND MY QUESTIONS HAVE BEEN ANSWERED. I UNDERSTAND THAT I MAY ASK QUESTIONS AT ANY TIME AND THAT I AM FREE TO WITHDRAW FROM THE PROJECT AT ANY TIME WITHOUT CAUSING BAD FEELINGS OR AFFECTING MY MEDICAL CARE. MY PARTICIPATION IN THIS PROJECT MAY BE ENDED BY THE INVESTIGATOR OR BY THE SPONSOR FOR REASONS THAT WOULD BE EXPLAINED. NEW INFORMATION DEVELOPED DURING THE COURSE OF THIS RESEARCH PROJECT WILL BE GIVEN TO ME AS IT BECOMES AVAILABLE. I UNDERSTAND THAT THIS CONSENT FORM WILL BE FILED IN AN AREA DESIGNATED BY THE HUMAN SUBJECTS COMMITTEE WITH ACCESS RESTRICTED TO THE PRINCIPAL INVESTIGATOR, DONALD JOHNSON, OR AUTHORIZED REPRESENTATIVE OF THE COLLEGE OF NURSING. I UNDERSTAND THAT I DO NOT GIVE UP ANY OF MY LEGAL RIGHTS BY SIGNING THIS FORM. A COPY OF THIS SIGNED CONSENT FORM WILL BE GIVEN TO ME.

_____ _____

Subjects Signature Date

_____ _____

Guardian (if necessary) Date

INVESTIGATOR'S AFFIDAVIT

I have carefully explained to the subject the nature of the above project. I hereby certify that to the best of my knowledge the person who is signing this consent form understands clearly the nature, demands, benefits and risks involved in his/her participation and his/her signature is legally valid. A medical problem or language or educational barrier has not precluded this understanding.

_____ _____

Investigators Signature Date

Donald Johnson, R.N., Graduate Student
University of Arizona, College of Nursing
Tucson, AZ 85721

Phone 325-7810

REFERENCES

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Ancoli-Israel, S., Kripke, D. F., Mason, W., & Kaplan, O. J. (1985). Sleep apnea and periodic movements in the aging sample. Journal of Gerontology, 40, 419-425.

Ancoli-Israel, S., Parker, L., Sinaee, R., Fell, R. L., & Kripke, D. F. (1980). Sleep fragmentation in patients from a nursing home. Journal of Gerontology, 44, M18-21.

Baker, T. L. (1985). Introduction to sleep and sleep disorders. The Medical Clinics of North America, 69, 1123-1152.

Billiard, M., & Besset, A. (1987). Insomnia in the elderly. In W. Emser, D. Kurtz, & W. B. Webb (Eds.), Sleep, aging and related disorders: Vol. 22. Interdisciplinary topics in Gerontology. H. P. von Hahn (series Ed.) (pp. 98-110). Basel: Karger.

Blios, R., Feinberg, I., Gaillard, J., Kupfer, D., Webb, W. B. (1983). Sleep in normal and pathological aging, Experentia, 39, 551-558.

Bliwise, D. L., Bevier, W. C., Bliwise, N. G., Edgar, D. M., & Dement, W. C. (1990). Systematic 24-hour behavioral observations of sleep and wakefulness in a skilled-care nursing facility. Psychology and Aging, 5, 16-24.

Bonnet, M. H. (1985). Effect of sleep disruption of sleep, performance, and mood. Sleep, 8, 11-19.

Brewer, M. J. (1985). To sleep or not to sleep: The consequences of sleep deprivation. Critical Care Nurse, 5(6), 35-41.

Campbell, D. T., & Stanley, J. C. (1963). Experimental and Quasi-experimental Designs for Research. Boston: Houghton Mifflin Company.

Carskadon, M. A., Brown, E. D., & Dement, W. C. (1982). Sleep fragmentation in the elderly: Relationship to daytime sleep tendency. Neurobiology of Aging, 3, 321-327.

Carskadon, M. A., & Dement, W. C. (1979). Effects of total sleep loss on sleep tendency.

Perceptual and Motor Skills, 48, 495-506.

Carskadon, M. A., & Dement, W. C. (1981). Respiration during sleep in the aged human. Journal of Gerontology, 36, 420-423.

Carskadon, M. A., & Dement, W. C. (1985). Sleep loss in elderly volunteers. Sleep, 8, 207-221.

Chuman, M. A. (1983). The neurological basis of sleep. Heart and Lung, 12, 177-181.

Clapin-French, E. (1986). Sleep patterns of aged persons in long-term care facilities. Journal of Advanced Nursing, 11, 57-66.

Closs, S. J. (1988). Assessment of Sleep in Hospital Patients: A Review of Methods. Journal of Advanced Nursing, 13, 501-510.

Cohen, D., Eisdorfer, C., Prinz, P., Breen, A., Davis, M., & Gadsby, A. (1983). Sleep disturbances in the institutionalized aged. Journal of the American Geriatrics Society, 31, 79-82.

Colling, J. (1983). Sleep disturbances in aging: A theoretic and empiric analysis. Advances in Nursing Science, 6, 36-43.

Dement, W. C. (1976). Some must sleep while some must watch. New York: W. W. Norton & Company.

Dement, W. C., Miles, L. & Carskadon, M. A. (1982). "White Paper" on sleep and aging. Journal of the American Geriatrics Society, 30, 25-49.

Dement, W. C., Mitler, M. M. (1974). An introduction to sleep. In O. Petre-Quadens & J. D. Schlag (Eds.), Basic sleep mechanisms (pp. 271-296). New York & London: Academic Press.

Dement, W., Richardson, G., Prinz, P., Carskadon, M., Kripke, D., & Czeisler, C. (1985). Changes of sleep and wakefulness with age. In C. E. Finch & E. L. Schneider (Eds.), Handbook of the biology of aging (pp. 692-717). New York: Van Nostrand Reinhold.

Downey, R., & Bonnett, M. H. (1987). Performance during frequent sleep disruption. Sleep, 10, 354-363.

Frankel, B. L., Course, R. D., Buchbinder, R., & Snyder, F. (1976). Recorded and reported sleep in chronic primary insomnia. Archives of General Psychiatry, 33, 615-623.

Gress, L. D., Bahr, S. R. T., & Hassanein, R. S. (1981). Nocturnal behavior of selected institutionalized adults. Journal of Gerontological Nursing, 7, 86-92.

Hayter, J. (1983). Sleep behaviors of older persons. Nursing Research, 32, 242-246.

Herbert, M. (1978). Studies of sleep in the elderly. Age and Aging, 7 (suppl.), 41-45.

Hilton, B. A. (1976). Quantity and quality of patients' sleep and sleep-disturbing factors in a respiratory intensive care unit. Journal of Advanced Nursing, 1, 453-468.

Hilton, B. A. (1985). Noise in acute patient care areas. Research in Nursing and Health, 8, 283-291.

Hoch, C. & Reynolds, C. (1986). Sleep disturbances and what to do about them. Geriatric Nursing, 1, 24-27.

Jacobs, D., Ancoli-Israel, S., Parker, L., & Kripke, D. F. (1989). Twenty-four hour sleep-wake patterns in a nursing home population. Psychology and Aging, 4, 352-356.

Johns, M. W. (1971). Methods for assessing human sleep. Archives of Internal Medicine, 127, 484-492.

Johns, M. W. (1977). Validity of subjective reports of sleep latency in normal subjects. Ergonomics, 20, 683-690.

Johnson, C. H., & Hastings, J. W. (1986). The elusive mechanism of the circadian clock. American Scientist, 74, 29-36.

Johnson, L. C., Townsend, R. E., & Wilson, M. R. (1975). Habituation During Sleeping and Waking. Psychophysiology, 12, 574-584.

Kahn, E., & Fisher, C. (1969). The sleep characteristics of the normal aged male. Journal of Nervous and Mental Disease, 148, 477-494.

Kahn, E., Fisher, C., & Lieberman, L. (1970). Sleep characteristics of the aged female. Comprehensive Psychiatry, 11, 274-278.

Kales, A., & Kales, J. D. (1974, Feb. 28). Sleep disorders. New England Journal of Medicine, 290, 487-499.

Karacan, I., & Williams, R. L. (1983). Sleep disorders in the elderly. American Family Physician, 27, 143-152.

Leigh, T. J., Bird, H. A., Hindmarch, I., Constable, P. D. L., & Wright, V. (1988). Factor Analysis of the St. Mary's Hospital Sleep Questionnaire. Sleep, 11, 448-453.

Lerner, R. (1982). Sleep loss in the aged: Implications for nursing practice. Journal of Gerontological Nursing, 8, 323-326.

Long, M. E. (1987, December). What is this thing called sleep? National Geographic, 787-821.

Miles, L. E., & Dement, W. C. (1980). Sleep and Aging. Sleep, 3, 119-220.

Morgan, K. (1987). Sleep and Aging. Baltimore: John Hopkins University Press.

Morgan, K., Dallosso, H., Ebrahim, S., Arie, T., & Fentem, P. H. (1988). Characteristics of subjective insomnia in the elderly living at home. Age and Aging, 17, 1-7.

Muncy, J. H. (1986). Measures to rid sleeplessness. Journal of Gerontological Nursing. 12, 6-11.

Orr, W. C. (1980). Arousals from sleep: Is a good night's sleep really good? International Journal of Neuroscience, 11, 143-144.

Pacini, C. M., & Fitzpatrick, J. J. (1982). Sleep patterns of hospitalized and nonhospitalized aged individuals. Journal of Gerontological Nursing, 8, 327-332.

Pfeiffer, E. (1975). A short portable mental status questionnaire for the assessment of organic brain deficit in elderly patients. Journal of the American Geriatrics Society, 23, 433-441.

Poelstra, P. A. M. (1984). Relationship between physical, psychological, social, and environmental variables and subjective sleep quality. Sleep, 7, 225-260.

Rechtschaffen, A., & Kales, A. (1968). A Manual of Standardized Terminology, Techniques and Scoring System for Sleep Stages of Human Subjects. Washington, D. C. : Public Health Service, NIH Publication No. 204, Government Printing Office.

Regestein, Q. R. (1980). Insomnia and sleep disturbances in the aged. Journal of Geriatric Psychiatry, 13, 153-171.

Regestein, Q. R., & Morris, J. (1987). Daily sleep patterns observed among institutionalized elderly residents. Journal of the American Geriatrics Society, 35, 767-772.

Reynolds, C. F., Kupfer, D. J., & Sewitch, D. E. (1984). Diagnosis and management of sleep disorders in the elderly. Hospital and Community Psychiatry, 35, 779-781.

Reynolds, C. F., Kupfer, D. J., Taska, L. S., Hoch, C. C., Sewitch, D. E., & Spiker, D. G. (1985). Sleep of healthy seniors: A revisit. Sleep, 8, 20-29.

Ross, M. M., Hare, K., & McPherson, M. (1986). When sleep won't come. Canadian Nurse, 10, 14-18.

Roth, T., Kramer, M., & Trinder, J. (1972). The effect of noise during sleep on the sleep patterns of different age groups. Canadian Psychiatric Association Journal, 17, 197-201.

Snyder-Halpern, R., & Verran, J. A. (1987). Instrumentation to describe subjective sleep characteristics in healthy subjects. Research in Nursing and Health, 10, 155-163.

Spiegel, R. (1981). Sleep and sleeplessness in advanced age. New York: Sp Medical & Scientific Books.

Spiegel, R. & Azcona, A. (1985). Sleep and its disorders. In M. S. J. Pathy (Ed.), Principles and practice of geriatric medicine (pp. 197-207). New York: Wiley Medical Publication.

Webb, P. (1974). Periodic breathing during sleep. Journal of Applied Physiology, 37, 889-903.

Webb, W. B. (1979). Theories of sleep function and some clinical implications. In R. Drucker-Colin, M. Shkerovich, & M. B. Sterman (Eds.), The function of sleep (pp. 19-35). New York: Academic Press.

Webb, W. B. (1982a). Sleep in older persons: Sleep structures of 50- to 60- year-old men and women. Journal of Gerontology, 37, 581-586.

Webb, W. B. (1982b). The measurement and characteristics of sleep in older persons. Neurobiology of Aging, 3, 311-319.

Webb, W. B. (1987). Disorders of aging sleep. In W. Emser, D. Kurtz, & W. B.

Webb (Eds.), Sleep, aging and related disorders: Vol. 22. Interdisciplinary topics in Gerontology. H. P. von Hahn (series Ed.) (pp. 1-12). Basel: Karger.

Webb, W. B. (1989). Age-related Changes in Sleep. Clinics in Geriatric Medicine, 5(2), 275-287.

Webb, W. B., & Swinburne, H. (1971). An observational study of sleep of the aged. Perception and Motor Skills, 32, 895-898.

Webster, R. A., & Thompson, D. R. (1986). Sleep in hospital. Journal of Advanced Nursing, 11, 447-457.

Zepelin, H., McDonald, C. S., & Zammit, G. K. (1984). Effects of age on auditory awakening thresholds. Journal of Gerontology, 39, 294-300.